approach

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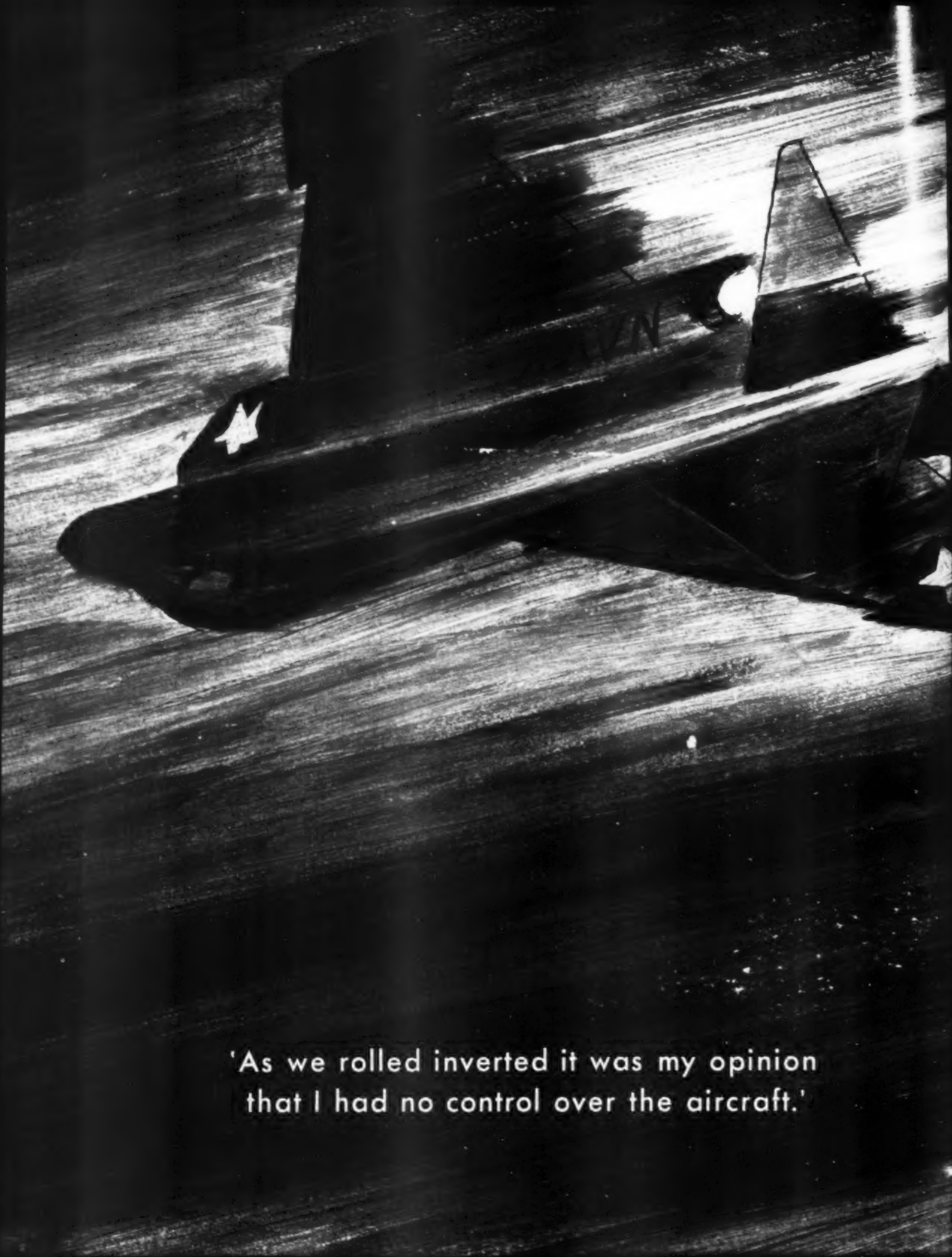

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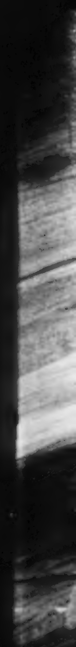

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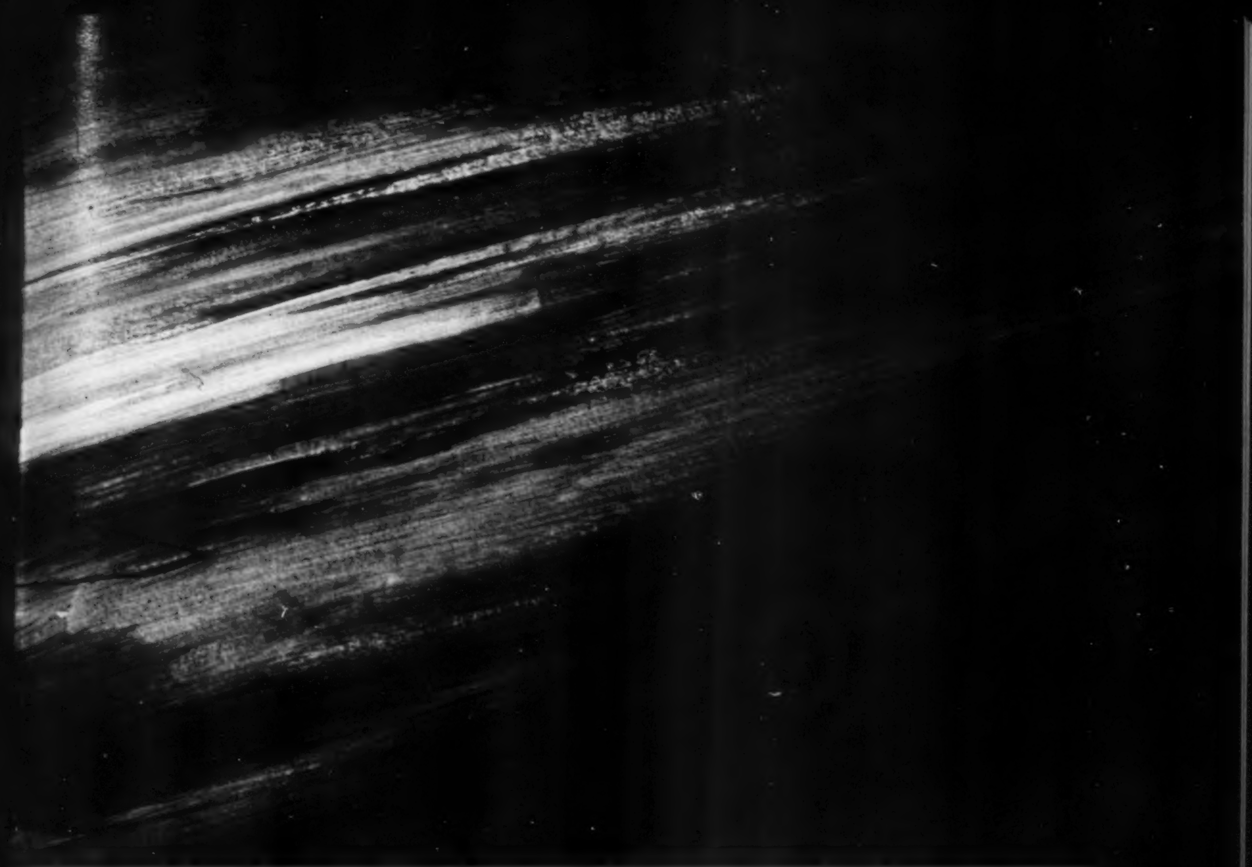


A Tale of Two Survivors

Shortly after takeoff during night carrier operations, the pilot and RIO of an F-4B ejected in a semi-inverted position, 5000 ft above the water. Both ejection and survival narratives contain valuable survival information. The pilot tells his story first. . .

"As we rolled inverted it was my opinion that I had no control over the aircraft. Two times I told the RIO to eject and then I hesitated. He still hadn't gone so I yelled the third 'Eject!' at the top of my voice. On the third ejection call, I heard the RIO's seat explode and knew he had left the aircraft so I reached up and pulled my ejection handle.

"Ejection was as advertised. I was probably three-quarters of the way around in a 360-degree roll, almost inverted, when I left. The ejection was a good one and I had no sense of severe pressure in my back. I didn't even have time to think about pulling the manual release before the chute was open.

"Opening shock was very slight. After I cleared the aircraft I saw I had a good chute. I could still hear the plane going down but I could not see it. The RIO's chute was slightly below me and I could see him in the moonlight about 100 yards away. I yelled across and asked him if he was OK and he said that he was 'swinging.' He said he was not hurt so I figured everything was in pretty good shape. My oxygen mask had worked properly; I received bailout oxygen as I should have. After I disconnected the mask from the seat pan, there were so many other straps, cords, etc., flying around that I decided to get rid of it and threw it away.

"I then released the left side of my seat pan so that

'Once I released the raft, it was no sweat...'

it hung from my right side. I picked up the seat kit and pulled the yellow and black handle to deploy the raft. The raft fell away as it should have and inflated." (*This is incorrect procedure for the rigid seat kit. With the rigid seat kit you do not release either side. Just pull the kit release handle to deploy the raft.)*

"Once the raft dropped down, the sea anchor and raft began swinging in the wind. The raft was doing me more harm than good because it was causing me to oscillate about 45 degrees each side of center. I decided to get rid of the raft at about 100 ft above the water but evidently I turned it loose too soon. I'd say I released it at about 1000 ft. I realized that I had misjudged my distance above the water because I watched it fall for quite some time. It landed in the water directly underneath me.

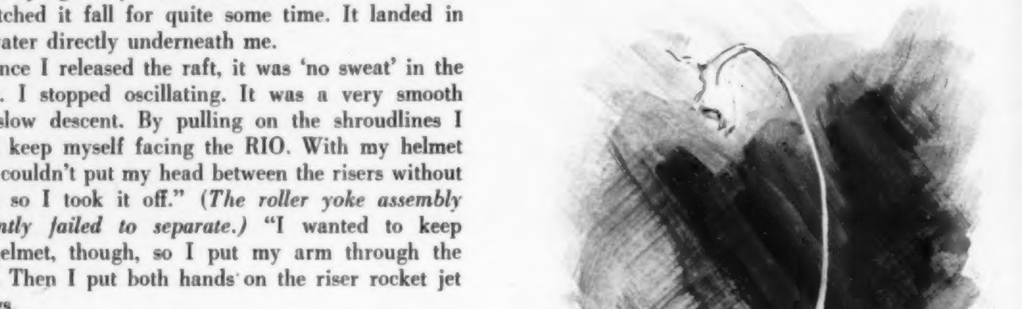
"Once I released the raft, it was 'no sweat' in the chute. I stopped oscillating. It was a very smooth and slow descent. By pulling on the shroudlines I could keep myself facing the RIO. With my helmet on, I couldn't put my head between the risers without effort so I took it off." (*The roller yoke assembly evidently failed to separate.)* "I wanted to keep the helmet, though, so I put my arm through the strap. Then I put both hands on the riser rocket jet fittings.

"I could see the water 'coming up' pretty well by this time (we had a good moon) so I looked straight ahead. When my feet hit the water, I released the rocket jet fittings with no trouble at all. The chute left immediately, and as soon as I was in the water I pulled both toggles on my Mk-3C life preserver and it inflated. From then on, it was no big problem.

"Just before touchdown, I saw the lights of two destroyers. They were on the opposite side of me from the moon. I faced in the direction of the ships, took out my pistol and fired about three tracers straight up into the air. Then I called to the RIO. He answered. I'd say he was about 80 to 100 yards away. I was concerned with joining him because I could not find my raft after I hit the water. Although my Mk-3C life preserver was tight and both chambers inflated, I wanted to join him if possible and hang on to his raft.

"I began to paddle toward him. We fired a couple of tracers over each other's heads to show our positions. I had my whistle out and I began to swim towards the RIO while periodically blowing the whistle. After about five minutes of this, I realized that I was going to get pretty tired if I continued, so I decided to just float and wait for the destroyers since they seemed to be getting closer. I fired six rounds from my pistol, reloaded and decided to wait until the lights got closer.

"I had been in the water about 20 minutes before I saw a helicopter on the horizon. As the helo ap-



proached I saw that the RIO had managed to light one of his distress signal flares." (*The pilot was unable to find the distress signal flares in his Mk-3C or locate the flare in his survival vest. His old-type survival light failed to work although it was working two days before.)* I decided to just stay put and let them pick him up first. The helo spotlight picked out the RIO and they quickly hoisted him aboard. Then they made one pass looking for me but it seemed like they were about a half mile too far to the south. I had reloaded my revolver and began to pull flares out of my survival vest." (*The pilot is referring here to two red star flares.)* "I figured maybe the helo had a load and was taking the RIO back to the ship before returning for me.

"I shoved both star flares into the left thigh pocket of my flight suit so they would be readily available. I double-checked my pistol, put my whistle up where I could find it and just sat back and waited. The helicopter made a circle and it appeared once again that he was still searching so I fired off two more rounds from my pistol. I don't believe he saw the two tracers.

"Then I decided to use the new pencil flare gun that I carried in my survival vest. I had some trouble finding it because of the way the Mk-3C rode up under my chin. It is difficult to get underneath it to the survival vest but by pushing the Mk-3C down around my waist and leaning back, I was able to get my pencil flare gun which was tied to a string that led up to my left shoulder strap. I then pulled the string from my shoulder buckle and quickly tied the pencil flare gun to my right wrist. Tearing the plastic ammo bag with my teeth, I put a few shells in my mouth and shoved the rest into my flight suit pocket. I loaded the pencil flare gun.

"When the helo got to about a quarter of a mile away I fired the second star flare." (*The first had failed to ignite.)* "This time they turned the searchlight on and headed straight for me. The helo's approach was slow and deliberate and I began to fire the pencil flare gun as quickly as I could fire and reload (which was no problem in the 70° water). I put my helmet back on. It must have shown up pretty good in the water because they put the spotlight on me and came right up. I was glad I had saved the helmet once the chopper got overhead because the spray from the chopper blades was really terrific. The only way I could find the seat they had lowered was to turn my back to the chopper and just periodically look over my shoulder.

"The helo made one pass that placed the rescue seat slightly in front of me. I tried to swim for it but it was moving away so I just sat still and waited until he circled again and came back. He was right on the money the second attempt. He dropped it about three feet from me and I made about three strokes and climbed aboard and locked my legs and arms tightly around the seat. As briefed, I didn't try to get myself in the helicopter. I just kept hugging the seat as they hoisted me up and pulled me aboard.

"Five minutes later we were back on the flight deck."

Continued

The RIO's story...

"While I was looking at the scope, the aircraft started a roll to the left. Approximately the time we passed through 90 degrees of roll to the left, the pilot said, 'Eject, eject!' I looked at the gyro and saw we had passed 90 degrees of bank and the airspeed was approximately 140 to 150 kts but dropping. *I just couldn't bring myself to realize that this was happening to us and that something this serious had happened to the aircraft.*

"The pilot said one more time, 'Eject!' I reached up and pulled the curtain . . . I think the plane had completed one full roll and I went out in about a 15-30 degree left bank on the second roll.

"I remember, just after going out, that the face curtain pulled away from me and I could see the shadow of the plane below me. The opening shock of the chute was not too great. I looked up at the canopy and it looked so small I wasn't sure if it was the personnel chute or the drogue chute.

"At this time, I dropped the face curtain. I was having a hard time getting my helmet back between the risers. There was a strap connected to both risers which is part of the shoulder harness locking mechanism. Once I got this back behind my helmet, I could move my head all right." (*The RIO is referring to the roller yoke assembly which also gave the pilot trouble, causing him to shed his helmet. Ordinarily, this roller yoke assembly separates during parachute deployment.*)

"I looked over and could see the pilot coming down in his chute 80 to 100 yards away. I still had my oxygen mask on and the bailout oxygen was working properly. I took my mask off and shouted to him, asking if he was all right. He said 'yes' and at that time I saw his raft and seat kit fall away from him. Then he called me and asked me if I had mine deployed yet. I said 'no' and I reached back and pulled the yellow handle and the raft dropped away. I could hear the raft inflating and the sea anchor flipped back up and got tangled around my legs. I got it untangled and found the raft was causing me to oscillate about 30 degrees or so either side of center. At that time I thought about getting rid of the raft but decided against it. I did not at any time during the descent release either side of the seat kit." (*This is correct procedure for the rigid seat.*)

"It seemed like it was taking us an awfully long time to make the descent. I called to the pilot a couple more times to make sure he was all right.

"When I hit the water, the impact was not too great. I reached up and released the right rocket jet fitting with no sweat at all, but the left one gave me some trouble. I finally got both hands on it and it came off. I went under water a couple of times in the process of getting free of the chute, but the chute was not actually dragging me. Immediately after I got rid of the left rocket jet fitting, I went under water two more times. I pulled the right toggle of my Mk-3C life preserver. Nothing happened

so I reached over and got both hands on the left toggle and pulled it all the way down. In the meantime I'd gone under water again. The second chamber of the life preserver didn't inflate either. Later inspection of my Mk-3C revealed that neither CO_2 cartridge had been punctured but the left one had a small indentation in it." *(In the Mk-3C life preserver, there is no way a pilot or RIO can preflight the CO_2 cartridges to see that they are seated. The rigger and quality control inspector were at fault here.)*

"At this time I started for the raft which was only three to five yards away from me and got my right elbow up in the raft and got situated. I ridded myself of a few of the shroud lines which were tangled around my legs and left arm. I started to climb into the raft and remembered that I still had the seat pan on my right side. I pulled myself around and climbed into the raft with the seat pan hanging over the right side. I was tangled in the shroud lines pretty badly. After getting in the raft, I took my knife and cut the shroud lines off, completely clearing myself of the chute.

"After I had been in the raft for a minute or so, I called and heard the pilot reply. He seemed to be between 100 and 200 yards away. He said he was all right and asked if I was in my raft. I said yes.

"I hauled the survival kit in the raft and tied a piece of shroud line around it and secured it to the raft. About this time I found my whistle and blew it. Shortly thereafter I heard the pilot's whistle. Then we each fired a tracer in the air. I blew my whistle again a few times. All during this time, I was trying to maneuver the raft to get closer to the pilot, but doubt if I closed in more than 15 to 20 yards from the 100 to 200 yards originally between us.

"I'd been in the water 10 to 15 minutes when I heard a helicopter coming. I fired two more tracers and then saw the helicopter's rotating beacon. I got a distress signal flare out of my survival vest and lit it off. The helo came in and started a circling approach. The flare lasted about five to seven seconds so threw that one away and got my second and last distress signal out of my survival vest and lit it off." *(It would have been a good idea to have saved the day smoke end of the distress signal flare just in case.)* "At this time the helo was approximately 300 yards from me. As the helo approached, I ignited a distress signal flare from my Mk-3C.

"I had taken my helmet off so I could hear the pilot so now I put it back on and got out of the raft and pushed it away from me. As the helo started its approach, the little pellets of water that the rotor

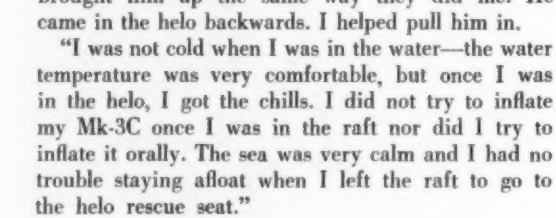
'The pilot's approach was professional in all respects.'

wash makes were kicking up quite a storm. I was having a hard time seeing the rescue seat so I put my visor down. Although it was my sun visor, I had no problem at all seeing the seat or the helo as it approached. The helo was very well lit.

"They brought the rescue seat right to me the first pass. Just before the helo got to me, the seat lifted out of the water and swung about 10 to 12 degrees about 10 ft from me. As it swung back, I got hold of it, got on it, and was hoisted up . . . They turned me around and brought me into the helo backwards. The helo crew then started to look for the pilot.

"I had been in the helo about five minutes and still we hadn't seen any of the pilot's tracers or flares. Then we saw a flare and it became very evident where he was. As we were hovering over him, the helo crew seemed to be having a hard time getting the seat close enough to him for him to get hold of it. Finally, he got a good grip on the seat and they brought him up the same way they did me. He came in the helo backwards. I helped pull him in.

"I was not cold when I was in the water—the water temperature was very comfortable, but once I was in the helo, I got the chills. I did not try to inflate my Mk-3C once I was in the raft nor did I try to inflate it orally. The sea was very calm and I had no trouble staying afloat when I left the raft to go to the helo rescue seat."



The rescued pilot had high praise for the helo pilot and his crew.

"The helo pickup was like a training movie," he reports. "I understand the problems involved in flying a helo around that close to the water at night and I was very impressed with the copilot's handling of the spotlight (which I understand requires some finesse) and the pilot's calm and deliberate approach for a real smooth, no-rush type pickup that was professional in all respects."

Rescue personnel noted that:

• "Reflective tape on the survivors' helmets aided immeasurably in the actual pinpointing of the survivors.

• "While making an actual approach to the hover on instruments, all outside communications should be stopped, if possible, since maneuvering the helo requires complete concentration on the part of both pilots and crewmen.

• "The pencil flares seemed to be more effective (in this case) than the pistol flares (tracers) in that they stayed lit longer and dispersed over a wider area.

• "Accompanying destroyers should be advised to stay well clear of the rescue area since under higher temperatures and lower wind conditions maneuvering the helicopter around them could have led to difficulties." *(The helo had to maneuver to the starboard in order to avoid a destroyer in the climbout just after completing pickup of the pilot.)*

• "The pilot had difficulty in finding the rescue seat due to the pellets of water from the rotor wash. However, the RIO solved this problem by lowering his visor. He was able to see without any difficulty.

• "Both survivors were well-informed on rescue procedures, making the pickup as smooth as possible.

• "Prior training by helo pilots and crewmen and many such practice approaches aided in making the rescues routine."

As a result of this accident, the squadron was directed to review its survival training program stressing in particular equipment preflight and operation. The pilot in this case discarded his life raft and the RIO's life preserver failed to inflate because the CO_2 cylinders were not properly seated.

"Had both of these failures happened to *the same person*," the fifth endorser to the Aircraft Accident Report points out, "a fatality might well have resulted."

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Recip Failure Symptoms

Looking for a quick review of prefailure symptoms pertinent to the most common causes of power failure? The symptoms described here are generally correct for normal operations but they can vary with specific operating conditions.

Fuel Starvation. Insufficient or obstructed flow of fuel to the carburetor causes sputtering, backfiring, and erratic operation. The manifold pressure, RPM, fuel flow, and fuel pressure instruments will be affected.

Carburetor Icing. Usually indicated by a gradual loss of power; however, in extreme icing conditions, the decrease in power may be rapid. Some engines will backfire with intermittent increase and decrease of power. Check the applicable technical publications for the particular engine installed. Usually, only the manifold pressure and carburetor air temperature instruments are affected.

Excessively Rich Fuel Air Mixture. The engine will usually run cooler than normal with intermittent missing (gulping) and torching. Torching is characterized by a long, dull red exhaust flame, visible at night, and heavy black smoke during daylight. The cylinder head temperature gage will be the first instrument affected and will reveal a reduced cylinder head temperature. After prolonged operation, the oil temperature gage will read lower than normal, and manifold pressure and RPM instruments will show a loss of power.

Excessively Lean Fuel Air Mixture. A lean mixture will induce detonation and preignition characterized by backfiring, loss of power and subsequent engine failure. The exhaust flame will be light in color and short in length, with little or no visible smoke. When preignition develops, the flame will become deeper in color and may be accompanied by visible smoke.

Ignition System Failure. Ignition failure will generally start as an intermittent miss and progress to a steady miss with resultant vibration and loss of power. Rumbling and afterfiring is caused by explosion of the fuel that was pumped, unburned, through the combustion chamber. In severe cases, the exhaust flame will have the appearance of an excessively rich mixture. The first indication will be the vibration of the engine. Engine instruments will not be affected until the condition has progressed to a serious state.

Detonation and Preignition. Detonation and preignition are induced by any one of a number of other malfunctions which might go undetected. The exhaust flame is dull red with heavy black smoke. Preignition can progress so rapidly that it cannot be recognized from the cockpit until internal engine failure occurs.

Internal Engine Failure. Internal engine failure can occur with almost no warning. If failure is caused by loss of oil, a drop in oil pressure may immediately precede the failure. *—FSF Mechanics Bulletin*

Terminal Turbulence

By William W. Hare

Air Controller, NAS Jacksonville

Those who throw their challenge to the wild blue and take to the air in flying machines are familiar with turbulence—light, moderate and extreme, all caused by atmospheric conditions.

Terminal turbulence is a non-atmospheric condition classified only as moderate and violent and encountered often after several hours of I, F, and R turning and burning when Goodtime Center informs you to contact Wayout Approach Control on three umpty ump point four now. The origin of terminal turbulence can be one of many things: a few laps around the local holding pattern, fatigue, overworked controllers and pilots, a radar vector over the surrounding countryside or sometimes by a simple misunderstanding of terminal procedures.

It is doubtful that peace and harmony will reign supreme as a result of this article; however, a review of the terminal concept and related procedures may result in a reduction of the turbulence classification.

Back in the pre-Federal Aviation Agency era the Air Route Traffic Control Centers controlled most of the IFR departures and arrivals from wheels-off to touchdown. The terminal facilities as we know them today were primarily control towers and communications relay stations. The cauliflower ears and calloused hands of many of the old controllers are the direct result of countless hours spent clutching the old inter-facility Service Fox handset.

In more recent years the Air Route Traffic Control Centers have become real estate "agents." Each of the 28 FAA operated centers parcels out pieces of aerial real estate to the various approach control facilities under its jurisdiction. There are some fancy real estate deeds resulting from these transactions represented by the "letters of agreement" between facilities concerned.

The format for these little jewels of ATC togetherness are contained in FAA publication *Air Traffic Procedures* (ATP) 7230.1A and they are countersigned by the Commanding Officer or Facility Chief concerned. These documents define the limits of airspace, designate departure and arrival hand-off fixes and contain all of the coordination procedures necessary for the control of IFR traffic. So, if some of the terminal routing seems to be a bit Mickey Mouse, one might find solace in the thought that the controller is following approved procedure and that it is all part of the master airspace jig saw puzzle.

Approach control facilities have some varied and interesting designations. A radar approach control associated with the Air Force is a RAPCON, while a radar air traffic control center associated with the Navy is a RATCC. It is noteworthy that not all of the Navy RATCC's have approach control authority. Some are basically fixed GCA Units and others are operated on a kind of brother-in-law basis with the Federal Aviation Agency. Preferring the more simple approach, the FAA merely sets up shop in an area near the control tower and refers to it, of all things, as an IFR room.

There are some 204 approach control facilities operated by the FAA and 57 operated by the Department of Defense. Whether FAA or DOD, the controller working any aircraft on an IFR flight plan is an FAA qualified controller. If he happens to be a trainee, a qualified controller is strapped in right next to him and is completely responsible for his every action.

When encountering one of those rare occasions when a pilot encounters a logjam of traffic over his destination, thereby necessitating holding, the holding instructions will end with "Expect approach clearance at blankety blank one six." At this point in the flight the pilot encounters an item that continues to place high on the misunderstood list—the EAC, expected approach clearance time. In this instance, the EAC is in accordance with ATP 7110.1B and is simply the time which it is expected that an arriving aircraft will be cleared to commence approach for landing. It is issued for lost communications, and to tell the pilot how long he will have to hold. Fuel considerations may require the pilot to divert or request priority. The controller should either clear the holding aircraft for the approach or revise the EAC before it expires. *In this holding situation nothing is written that requires the pilot to adjust his holding pattern flight path in order to be*

at the approach fix on the expected approach clearance time issued.

In the event that the controller is using *timed approaches* in accordance with ATP 7110.1B, Para. 264.3, a time check will be given to each aircraft and a time specified to leave the approach fix inbound. This, of course, constitutes clearance so an EAC is not required. It is interesting to note that the planning type personnel failed to throw in an authorized abbreviation for the time element used in this stacking procedure. Wonder if something like TDF (time to depart fix) would be fitting?

Neither of these situations should be confused with the expected approach clearance, sometimes referred to as expect approach time (EAT), assigned prior to a launch from an aircraft carrier, or for shore based GCA operations. Each pilot is required to plan his flight path to depart Marshal at his approved EAC. It is, in essence, a combination expected approach clearance time and a specified time to depart Marshal inbound.

An item that is almost certain to spoil a terminal controller's instrument day is an unreported aircraft on an IFR flight plan that cannot be identified by radar. This situation causes him to smoke excessively, call for more coffee and scoff numerous compounds both buffered and unbuffered. The primary thought for the lost communications pilot to keep in mind is that this is an emergency situation and that he is not alone in his predicament. All control personnel make every effort to get, and keep, an aircraft that has experienced two-way radio failure under radar surveillance. In addition, attempts to establish communications are continued through all facilities and on every available frequency that has even a remote chance of being monitored by the pilot.

If the aircraft is functioning properly and the only problem is communications, stay with the established procedure for two-way radio failure. ATC will control traffic accordingly and, if necessary, suspend other IFR traffic in accordance with ATP 7110.1B, para. 521.2. If other troubles develop and the situation dictates, do not hesitate to squawk Mode 3, Code 77. *Remember that most air traffic control radar displays have Mode 3 capability only and will not indicate an IFF emergency squawk which is strictly a Mode 1 function.*

When filing to any of the large airports available to military aircraft, take time to read the information contained in the Aerodrome Facility Directory of the Enroute Supplement. Pay particular attention to the little goodies found in the Aerodrome Remarks section. These items are for real, and often necessitated by the mission of the installation concerned. With apologies to Alexander Pope, a little knowledge of things to expect on arrival can do wonders to ease the old frustration factor that has been known to lead to terminal turbulence.

The really big news in air traffic control today is, of course, the increasing use of radar and SIF, with computers right around the corner. While pilots may have experienced some frequency changes and radar vectors recently, the objective is the single frequency approach with the most direct radar vectors to touchdown. All control personnel are directed to make maximum use of radar for air traffic control purposes.

This step forward has certain disadvantages, as one instrument instructor so succinctly put it, "You people are ruining my students; hell, if he can read an altimeter and hold a heading he is on the runway." With this thought in mind, on those occasions when radar vectoring service is not desirable due to training or other reasons, notify the center prior to being handed off to the terminal controller. The FAA has a special student pilot identification as published in the *Airman's Information Manual*, page 1-2. This special identification enables air traffic control personnel to provide the student pilot with such extra consideration as he may require. So make the needs and desires known and traffic permitting, ATC will do everything possible to provide the requested service.

No review of terminal procedures could possibly be complete without a few words on that extremely popular misconception about the priority of an arriving aircraft on an IFR flight plan. All of the ground rules for this often-misunderstood item are given ample coverage in Flip Planning, *Airman's Information Manual*, and ATP 7110.1B. It is solely the pilot's prerogative to cancel his IFR flight plan; however, retention of the IFR flight plan does not afford priority over VFR flights. Clearance for a specific type of approach, ILS, ADF, VOR, Tacan, or Radar, does not mean that landing priority will be given over other traffic. Unless the facility mission dictates otherwise, and is so published, ATC continues to operate on a first come, first served basis.

All pilots are urged to visit air traffic control facilities whenever time and opportunity permit. Check the environment and observe the various tools of the trade, paying particular attention to range and capability. Finally, make it a point to meet the controllers, discuss problem areas, swap duty jokes, tell a lie or two and above all—see if they will spring for the coffee.

BOTTLE TO

Is alcohol a problem in flying? The *Naval Medical Newsletter* for August 1964 (NavMed, p. 639, vol. 44) reports that alcohol was a factor in 35 percent of all fatal *general civilian* aviation accidents during the past calendar year. Post-mortem examinations showed an average blood alcohol of 145 milligrams per 100 cubic centimeters of blood.

What does this mean? In experimental conditions at what must have been the world's happiest laboratory, it was found to be very difficult to relate the amount of alcohol in the blood (or in some cases the amount of blood in the alcohol) with the degree of impairment. As a guide line, however, the figure of 150 mg per 100 cc is generally accepted as the level making a man unfit to drive an automobile. This figure is widely used as a cut-off score by police departments who test the blood for alcohol in the case of a suspected drunken driver.

In the case of flying, where we have added responsibilities for maneuver, higher speeds, communication, navigation, wind, density altitude and so on, a very high level of performance is required, and almost no alcohol can be tolerated in the blood. An added danger factor is that the effects of alcohol are greatly increased by altitude. One drink at 10,000 ft may have the effect of three at sea level (any airline stewardess will confirm this observation). For safety, therefore, *there should be as much alcohol in your blood as there is molasses in your fuel*—and we all know that figure.

The problem is not the aviator who drains his glass of beer, picks his helmet up from the bar, strides through the swinging doors, and takes off. We all know better than that—and so did most of the general aviation pilots in the survey quoted earlier. The problem sneaks up on you, perhaps like this: An aviator has a drink before dinner (or two, if it's happy hour) and perhaps a glass of wine with dinner, then perhaps a small glass of brandy or a cordial afterwards. This can easily happen to you at a formal "must" the night before a flight. Or consider the case of the man watching a ball game or the late show until 0030 hours. You have to have something to wash those peanuts down, and pop tops are the most fun since the hula hoop.

These two men—the dinner guest and the tele-

THROTTLE

By CAPT G.W. Ingraham

Captain Ingraham is with the Office of the Flight Surgeon, U. S. Army Dispensary, Presidio of San Francisco, California.

vision watcher—have both been drinking in moderation. Neither has been high, although delicate tests would show a loss of coordination and judgment. They both go to bed and wake up feeling well—and they both have detectable amounts of alcohol in their blood when they take off at 0800!

The gimmick here is a simple fact of biochemistry as concrete and unalterable as the performance figures on any of the hardware we fly. It is simply this: *your body requires about three hours to get rid of one ounce of alcohol.* You cannot alter this figure by taking any pill, by any trick of eating before or after, or by any amount of sleep or coffee, any more than a 45-degree angle of attack will win you long life and greater lift. You simply are not built that way.

"Hold on, now," the boys in the back will reply. "I know that if I eat a meal while I am drinking, I never get high, but if I drink on an empty stomach, I have to watch it pretty closely." True enough. But this fact relates only to the *concentration of alcohol in your blood;* it has nothing to do with the *rate at which alcohol is cleared.*

Look at the curves in figure 1. Curve A represents the blood alcohol of a man who drinks four beers on a empty stomach; curve B shows the same for a man who drinks four beers with a meal. The first man gets a higher concentration in his blood, since he absorbs his beer rapidly (the stomach, having nothing else to do, passes the alcohol right along to the blood), and will probably feel the effects, while the second man, whose stomach is slowed up by the food, is a little slower. Notice, however, the important point: *it takes both men the same time to become completely free of alcohol,* since they both absorb it faster than it can be cleared.

It is this last delightful fact, incidentally, which makes alcohol "work." If this were not so there could never be more than a trace of alcohol in the blood, which would make it a poor beverage indeed to relax with! In fact, we would probably be using 20-year-old Scotch to wash parts with.

There will be occasions when you wish to bend the elbow and yet know that you must fly the next day. How do you know how much you may safely consume? How long must you wait before flying if you have had a drink? Is there anything you can

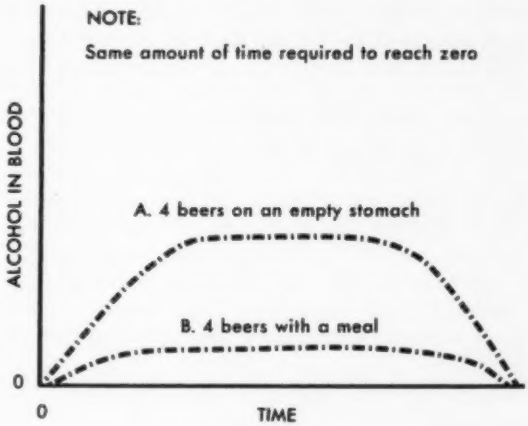
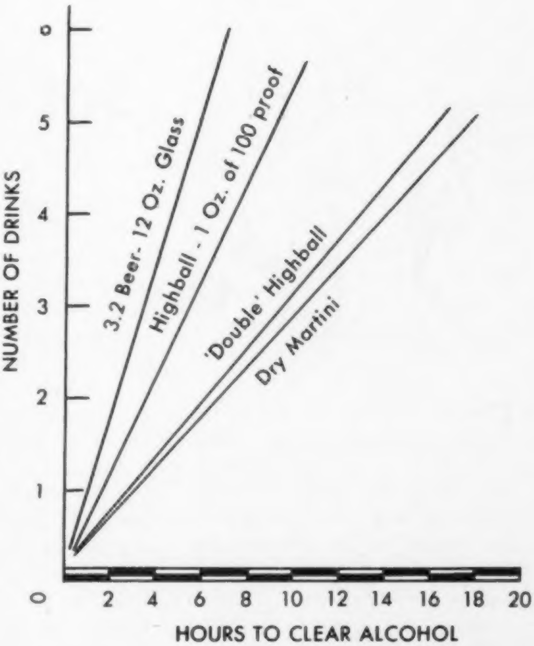


Figure 1



do, should an emergency arise, which will "clean you out" and allow you to fly safely?

The answer to the last question is, of course, NO. That's probably the most straightforward answer a

medic will ever give you, so pay attention! As to the first two questions, the answer is fairly simple. You know that it takes three hours to clear an ounce of alcohol. You know about how much alcohol is in a given drink. You therefore grab your slide rule and T-square and come up with something like the curve in figure 2. Since no two drinks ever have exactly the same amount of alcohol, and there are myriad brands and proofs, these curves are an approximation. To be really accurate, you would need a different curve for every brand in the bartender's arsenal.

It's easy to use the graph. If you know how long it will be before you fly, look up the time in hours and read the number of drinks you are allowed from the other scale. On the other hand, if you are at the club and are called to the flight line, simply reverse the procedure to find out how long you must wait before firing up. For safety's sake, round off to the lower number of drinks and the higher number of hours.

I have already mentioned that the curves are approximate, and I should probably add a disclaimer to the effect that they have absolutely no official standing. The important points to remember when dealing with alcohol and flying are these:

• An amount of alcohol which would produce no effect at sea level can kill you at 10,000 ft, by ruining your judgment and coordination.

• Therefore, there should be absolutely no alcohol in your blood when you fly.

• You cannot possibly clear more than one ounce of alcohol every three hours, *no matter what you do.* It makes no difference whether you feel the effects or not, whether you drink coffee by the hatful—*you need three hours to clear one ounce of alcohol.*

How dangerous is it to fly with traces of alcohol in your blood in case you decide to take a chance? In the general aviation accidents mentioned earlier, the average duration of the flights from takeoff to writeoff was 18 minutes.

—U. S. Army Aviation Digest, May 1965

Safety Course at USC

The Naval Aviation Safety Officer Course has been conducted at the University of California since 1954. Graduates of this course are vital to the Naval Aviation safety effort. This course is designed to prepare officers to conduct investigations of aircraft accidents, to properly report their findings and to assist commanding officers in conducting an aggressive aircraft accident prevention program in order to reduce aircraft accidents.

Prior completion of college-level courses in algebra and trigonometry is highly desirable for officers being ordered to this curriculum. This ten-week course of about 25 students per class consists of approximately 350 classroom hours. Twelve units of university credit are awarded upon successful completion of this course.

Aviators of the Navy and Marine Corps in the grade of Lieutenant and Captain and above are eligible for this course.

Quotas are administered by the Chief of Naval Personnel (Pers-B126) and the Commandant of the Marine Corps (AAZ).

Naval aviators who wish to attend this course enroute to new duty assignments should notify the Chief of Naval Personnel through the submission of an Officer Preference and Personnel Information Card (NavPers 2774) several months in advance of their projected rotation date. Officers will normally be ordered to this course in connection with permanent change of station orders. Officers are ordered to report to the Commanding Officer, NROTC Unit, University of Southern California, for temporary duty under instruction in the Aviation Safety Officer Course. When attendance on a temporary additional duty basis is requested, per diem and travel costs for officers attending the course will be chargeable to the activity making the request for the quota.

—Adapted from BuPersNote 1520 of 22 APR 65

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EMERGENCY ARTIFICIAL RESPIRATION

By LT Ron Amalong, MC

DURING the past few years, mouth-to-mouth breathing has been accepted as the superior method for administering artificial respiration.

Previously, the method was considered inadequate; it was reasoned that "used" air from a person's lungs contained less oxygen and more carbon dioxide than room air contained, and therefore could not be useful for artificial respiration.

When some courageous medical researchers completely paralyzed some not-so-courageous "volunteer" medical students and revived them with mouth-to-mouth breathing, they learned that the larger breaths used in mouth-to-mouth breathing actually provided *better* oxygenation and better carbon dioxide removal than that of a conscious person breathing on his own.

By measuring various factors of ventilation it was learned that all the back-pressure, arm-lift, hip-tilt, shoulder twist, toe-twitch methods of artificial respiration were less effective than mouth-to-mouth breathing. With the other manual methods, adequate amounts of air are *not* moved into the lungs of nonbreathing victims; the bending and twisting of the neck completely blocks the passage for air.

Whenever a person is found unconscious from *any* cause (drowning, electric shock, carbon monoxide poisoning, stroke, and so forth) he may not be breathing. Oxygen lack rapidly results in damage to the brain and stops the heart. **So Act Without Delay!!**

Untrained personnel can perform mouth-to-mouth breathing successfully *if* a few details of technique are observed.

1. Place the victim on his back. If there is foreign matter in the mouth, clean the mouth or throat with your finger or a piece of cloth.

2. Hold the victim's head tilted backward and hold his lower jaw upward, the so-called "sniffing" position. The jaw can be lifted upward so that the lower teeth are higher than the upper teeth by grasping the angles of the lower jaw just below the ear lobes. It can then be held this way by holding the fingers of one hand under the chin at the midline.

What has been accomplished thus far is an open, free straight airway.

3. Close the victim's nose with your free hand.

4. Take a deep breath, place your mouth over the victim's mouth with airtight contact, and blow. Blow forcefully into adults and gently into children. (If both hands are occupied, your cheek can press against the nose and prevent air leakage through the nostrils.)

5. Watch the victim's chest. When the chest rises, stop blowing and remove your mouth from the victim's mouth.

6. Let him exhale passively with the elasticity of his lungs and chest.

7. If the chest does not rise, improve the airway (clear the mouth, increase jaw support, position head better, blow more forcefully).

8. Repeat the breaths 12 to 20 times per minute (i.e., from three to five seconds apart).

In brief:

Position on Back
Clear Mouth
Head Back
Chin Up
Pinch Nose
Seal Mouth to Mouth
Blow

This is a good subject for a squadron briefing by your flight surgeon at an AOM or a division meeting.

AUTO PILOT SAVE

Pilot incapacitation in the cockpit, whatever the cause (hypoxia, heat prostration, hyperventilation, etc.), is not a cheerful subject. There is one case with a happy ending, however, which is worth talking about. What the F-8 pilot did to overcome the problem is told here.

"About 0800," the pilot said, "I was scheduled as bogie aircraft on a missile intercept hop. The flight leader briefed and we manned aircraft about 0930.

"After a normal preflight and start, I remained on the flight line, canopy closed, cabin pressurization on and oxygen mask off for approximately 15 minutes at idle RPM. Then I purged my oxygen mask, put it on and taxied to the duty runway.

"The flight leader and I waited for takeoff at the end of the runway another 10 or 15 minutes due to an emergency. During this time I felt perfect and do not recall any unusual odors in the cockpit.

"We took off about 1000. I was No. 2 and took about a 10-second interval, remaining about 3000 ft in trail, slightly stepped down.

"We were in a port turn on the Standard Instrument Departure when all of a sudden everything went blurry and appeared to spin. Later I estimated we had been airborne about three minutes with about 3000 ft of altitude when the feeling hit me. I became very dizzy, started to cold sweat.

"These three symptoms seemed to come on immediately. I pulled the 'green apple,' turned off my regular oxygen *and engaged the autopilot.* That is all I remember for I must have blacked out."

The action of engaging the autopilot may have been all that prevented an accident. While climbing out, the flight leader checked both port and starboard to see if his wingman had joined but did not see him. The leader was about to call when he heard the wingman declare an emergency.

"I was unconscious or semiconscious anywhere from a few seconds to a few minutes," said the wingman. "When I became knowledgeable I was no longer in trail position, but found myself level

All of a sudden everything went blurry and appeared to spin.

at about 9000 ft without sight of the lead aircraft. Remaining in autopilot, I dumped cabin pressurization, and opened the emergency ram-air vent. Next I declared an emergency . . . and shortly thereafter removed my mask (the emergency bottle emptied and I could not breathe).

"Autopilot remained ON and I began a shallow orbit while the flight leader was vectored to me. During the time I was orbiting, dizziness and tunnel vision seemed apparent. The flight leader rendezvoused and I could hear all the transmission; however, I did not acknowledge all of these due to my mask being off."

The flight leader joined up and questioned the wingman about his condition. "His replies were barely understandable," said the flight leader, "since his voice modulation was poor. After he had dumped the transfer fuel he stated he wanted to go in and land. I stated that we were not in a hurry and attempted to persuade him to stay up a while longer. He wanted to break from an overhead position while I argued that he should use GCA."

After receiving a clearance the wingman disengaged the autopilot but found that he could not maneuver the aircraft to his satisfaction. "I reengaged the autopilot," he said, "and remained in autopilot for five or ten additional minutes. The flight leader continually coached me which was very helpful.

"The straight-in Morest landing was uneventful with the exception of difficulty in finding the runway. From many previous approaches I knew where the runway should be; however, I did not actually see it until I was about one mile from touchdown (visibility was probably better than seven miles.) During the approach I remembered to shut the emergency ram-air vent."

The flight leader added, "His landing appeared good but in the future if I, as flight leader, am faced with a similar situation, I would direct my wingman to shut down, once in the Morest rather than attempt to taxi."

DEAD STICK LANDING

The pilot under instruction spotted an abandoned airstrip shortly after complete loss of power.

The early morning briefing thoroughly covered every flight phase and procedure that was to be practiced in the air during the E-1B familiarization flight. At the time all phases seemed clear to both the well-qualified instructor pilot and to the new pilot under indoctrination training. One of the phases discussed in detail was inflight securing of one engine.

The first item on the agenda after level-off at 7000 ft was to feather the starboard engine. Preliminary instructions to the new pilot were that after the instructor had feathered the engine, he would go through the single-engine procedures (memory items) and then call for the single-engine checklist.

The starboard engine was shut down by the instructor in the following manner:

- Directed student to turn the rudder boost ON
- Retarded the starboard throttle to IDLE
- Feathered the starboard engine
- Engaged the AC/DC CROSSTIE switches after observing the starboard generator and T/R warning lights ON

Upon feeling rudder pressure differential the student pilot pushed in left rudder and started through

the single-engine memory items.

- Rudder boost ON
- Prop controls FULL INCREASE
- Port throttle at 45 inches MAP
- Mixture controls RICH
- Landing gear handle UP
- Flaps set at $\frac{1}{3}$

At this point he called for the single-engine secure checklist and then began concentrating on holding heading and altitude. A little left rudder trim was applied at this time.

Just as the instructor was starting through the secure checklist, the pilot under instruction realized he had not covered the seventh memory item (Dead Engine—FEATHER) and proceeded to reach up and punch the port engine feather button.

The instructor reacted immediately by grabbing the button in an attempt to halt and reverse the feathering action, but it was too late—the port prop swung to a stop, fully feathered, in the midst of a deafening silence.

Power loss was complete and irretrievable.

Since the E-1B does not have a battery there was no possible way to restart either engine. The instructor steered the airplane toward an abandoned airstrip which had been spotted by the other pilot shortly after the *real* emergency developed. Since they were at 6000 ft and the field was only about three miles away, the prospects of making it looked good.

At 3000 ft, over the approach end of the 4000-foot concrete strip (high key) the instructor began a left-hand approach to a dead stick landing. Fuel selectors, magneto switches and mixture controls had been secured prior to reaching this point and all occupants were strapped in tight.

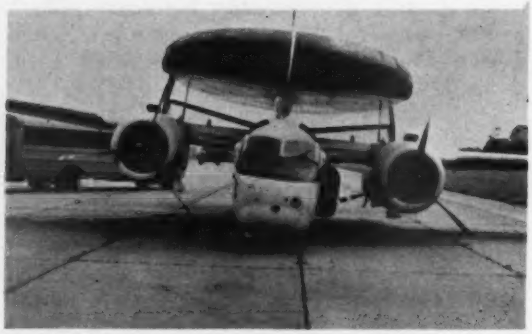
Although the instructor had intended to land with the gear up, he placed the gear handle in DOWN at the 90-degree position in an attempt to open the landing gear doors to afford some protection to the underside of the airplane. The doors did not crack, but the tail wheel dropped into position.

Touchdown occurred near the midpoint of the runway, wings level, at about 110 kts and slightly left of centerline. There was a 90-degree left crosswind of 12 kts with gusts to 20 kts, but the tendency to drift toward the left side of the runway was controllable with rudder during the 1200-foot slide. The occupants evacuated, unhurt, through the main entrance door.

The Board investigated the possibility of inadequate squadron indoctrination or preflight briefing and concluded that neither was a contributing cause in this accident.

The pilot under instruction understood that the starboard engine was the simulated failed engine, as emphasized by his action of advancing power on the port engine only while going through the memory items on the single engine checklist. Also, he was briefed on the ground, and again in the air, that the instructor would feather the starboard engine.

Initial altitude permitted sufficient time to lower the landing gear by use of the emergency hydraulic system. However, the pilot's decision to leave the gear up was considered proper for the following reasons:



Touchdown occurred near midpoint of 4000-ft strip.

- "No Engine" approaches had not been practiced in the E-1B.
- The pilot was not sure of runway surface composition until actually at high key over the field.
- Had the gear been pumped down before arriving at high key, the chances of reaching the field might have been jeopardized due to the higher sink rate resulting from the changed configuration.

NATOPS wasn't followed in feathering the starboard prop. The E-1B has two independent electrical systems (port and starboard). Each system is powered by the generator on its own side. If one generator fails, power for the failed side can be drawn from the working generator, through a CROSSTIE system. The port feather pump is powered by the starboard system and vice versa. Had the CROSSTIE system not been activated prior to its appearance on the NATOPS Engine Failure/Inflight Secure Checklist (a challenge and reply item) it would have been impossible to feather the port prop with the starboard engine and generator off the line. For this reason, premature CROSSTIE activation was considered to have been relevant in this mishap.

Board Conclusions

The primary contributing cause factor is pilot factor in that the student pilot feathered the prop of the only operating engine. It is of utmost importance that the pilot and copilot agree on the failed engine before feathering. A change to this effect will be submitted for inclusion in NATOPS.

The premature CROSSTIE of the AC/DC busses is considered to be a contributing factor in that it produced an electrical condition whereby inadvertent feathering of the port prop was possible.

E-1B design was considered as contributing in that the pilot had no possible means of restarting the engines during the 5-minute period between emergency and wheels-up landing.

Squadron policy contributed in that item No. 7 (Dead Engine-FEATHER) on the checklist was required to be a memory item according to the syllabus and its execution did not require the concurrence of both pilots.

Board Recommendations

- Use of the NATOPS checklists properly . . . check off the items in sequence. One endorser took exception to this recommendation, stating that "All eventualities cannot be programmed into a checklist." His point is well taken and it is in fact substantiated by a statement in the NATOPS Manual to the effect that ". . . no manual is a substitute for sound judgment." However, since considerable thought and research is directed toward arranging NATOPS checklist in the proper sequence, sound practice would dictate that the sequence be followed *whenever possible.*
- Exclude item No. 7 (Dead Engine-FEATHER) from the required (squadron) list of memory items on the Engine Failure/Inflight Secure Checklist and require that both pilot and copilot concur on the Dead/Simulated Dead engine before feathering. One Endorser agreed that both pilots should concur before feathering a prop but believed that item No. 7 should continue to be a memory item on the checklist. He stated, "If engine failure is encountered during takeoff, the only memory items from the checklist remaining to be completed are gear up, flaps to 1/3 (in the case of shipboard launch and FCLPs), FEATHER and fuel dump. In this situation, immediate feathering and dumping are critical in the E-1B. The fact that FEATHER is a memory item will decrease the time delay in completing this critical item (assuming concurrence by the copilot)."
  - Delineate the memory items on the NATOPS Engine Failure/Inflight Secure Checklist. A change has been submitted which recommends that the first eight items on this checklist be blocked off in black to designate them as memory items.
  - Investigate the feasibility of incorporating a restart feature in the E-1B.
  - Conduct training flights requiring actual feathering in a designated area selected for its suitability as an emergency landing area.
  - Incorporate into the NATOPS manual a deadstick landing pattern.
  - Practice simulated double-engine-failure approaches over a suitable runway utilizing the emergency system for lowering the gear.

submit an

ANYMOUSE *prevent an accident*

MONTH OF OCCURRENCE: ....

STATE — *WHAT* — *WHERE* — *WHY; HOW IT CAN BE PREVENTED OR CORRECTED*

The birds above are telling all.
Some hairy tales or real "close call."
ASOs have out forms you can submit,
Telling us the whole of "it."
It's hard to survey house to house
So how about an "ANYMOUSE?"
We'll print your tales for readers all,
In hopes they may prevent a fall.
The results a gain—and ours by far,
'Cause troubles are many in an AAR.
So! Heed this warning, and send in,
Your "ANYMOUSE" and help us win!!

This form can be used to submit any constructive item affecting aviation safety, including equipment, design, Murphy's Law, supply or other associated aviation support matters. Reports may be signed or remain anonymous. The identity of the writer will be withheld if so requested.

5ND 3568 (Rev. 9/63)

GRAY EAGLE

As a training officer, I was supposed to give a weapon check hop but the weather was generally around 400 ft and ¾ miles visibility with tops above flight level 350. Consequently I told the other pilot to plan an IFR cross-country and I would fly wing and evaluate his performance under actual instrument conditions.

Our takeoff weather was 400 ft and ¾ miles visibility with forecast weather to be 300 ft and ½ mile visibility at ETA with our alternate weather as 800 ft and two miles visibility with rain showers. There was no severe weather predicted; however, scattered thundershowers were predicted at both New Orleans and Pensacola.

The assigned flight level of 290 kept us in the soup approximately 90 percent of the time. After passing Jackson, Miss. a check of the latest weather disclosed that New Orleans (destination) was 300 ft and ½ mile while Pensacola (alternate) had 600 ft and one mile with rain showers.

I had briefed that if the weather was down to 300 ft I would make a separate penetration and GCA. While letting down from FL 290 my canopy iced over to a point where I considered it safer to detach from the lead aircraft and make an individual approach. New Orleans Center approved my request and I advised lead that I was detaching.

A vector to 230 degrees was given me, plus an assigned FL 210 and a new frequency. Shortly after steadying on two-three-zero, the clouds became very dense and dark and I encountered severe turbulence. Anticipating lightning I turned up the cockpit flood lights and lowered my dark visor. A few minutes later I was vectored left to 150 degrees and cleared to descend to 6000 ft with clearance limit as Navy New Orleans Tacan.

During this time the turbulence had decreased to light or moderate with light freezing rain changing to real heavy rain. Passing 15,000 ft and just after setting in New Orleans Approach Control, there was a blinding flash accompanied by a very loud explosive noise and a stunning jolt to me, followed by a tingling sensation all over my body. This was followed by a lonely silence in my radio and smoke in the cockpit with the smell that accompanies an electrical fire.

Reflex action had my hand on the emergency generator handle,

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

but this was not required. I then took inventory of the situation and noted that everything was operating except tacan, the radio, and fuel gage. This left me with only one course of action—to DR to my alternate making an off airways penetration hoping to be able to break out over the Gulf and follow the beach to Pensacola before running out of fuel.

My fuel gage had stopped at 2400 pounds and when I was struck by lightning I was 55 miles north of NAS New Orleans with an additional distance of 150 miles to fly from NAS New Orleans to NAS Pensacola. I continued my penetration to my clearance altitude of 6000 ft, hoping I might break out between cells so I could avoid the bad ones. I never broke out so when the estimated time to over NAS New Orleans had passed I knew I should be clear of the airways.

I then climbed to flight level 210, heading for Pensacola squawking Mode 3, 77 and emergency on my IFF. Soon I was back in the thunderbumpers again and was still in the soup when I leveled off at FL 210. After about 15 minutes of this I broke out between cells and continued for Pensacola. When five minutes out (estimated) I turned 30 degrees to starboard which appeared to be the area with the smaller of the thunderbumpers.

Almost immediately after starting my descent I was back in the soup and getting bounced around again with moderate to heavy rain at times. At 10,000 ft I turned to port and took up a heading of 030 degrees which I figured would head me toward the beach at a point west of Pensacola. I didn't want to chance overflying Pensacola because I knew my fuel was getting critical. I broke out at about 800 ft with about ¾ mile visibility in a rainshower.

Shortly thereafter I saw the beach and a field. I didn't remember the name, but having been an IBTU instructor back in 1952, I recognized it as one of the fields west of NAS Pensacola. By this time my fuel transfer light was ON and I knew I couldn't afford to miss finding a suitable landing field soon.

Though I was in rain with about one mile visibility, at least I was below the clouds and able to follow the beach. Recomputing fuel and

time, I figured I could make NAS Pensacola and if the rain prevented me from seeing the field there I would swing around to Saufley and if I missed Saufley I would head out to the Gulf and eject when approaching the beach. Then suddenly I broke out of the rain and spotted NAS Pensacola about two miles away. As I approached the field I rocked my wings and checked the wind direction for the duty runway. The tower gave me a green light and I noted that the crash equipment was already standing by.

The landing was uneventful and while taxiing into the parking area, I noticed that the *aft* portion of the pitot tube (which is located just forward of the windshield) looked like it had been hit by a welding torch.

In my 6000 hours of flying, with over 3800 in jet aircraft (which includes tours in five all-weather fighter squadrons) this is the first time I have been struck by lightning and knew it when it happened. I had been hit twice before but did not know it until after landing.

That night and for two days afterwards I had an ache in every joint in my body but other than that I noticed no other ill effects. As a matter of humor connected with the incident, the other members of the team said they were changing my old nickname of "Gray Eagle" to "Flash."

NATOPS

Very often a qualified pilot is called upon to engage the rotors of the helos in the squadron for the purpose of tracking the aircraft. As it happened the pilot engaged the UH-34D without the use of the NATOPS checklist.

Following engagement the rotors were disengaged in order to allow the maintenance personnel to adjust the pitch change rods.

While the mechanic was standing on the transmission door platform he asked the pilot to release the rotor brake to gain access to each pitch change rod.

As the rotor brake was released the clutch light came on and the rotor head began to rotate.

The pilot had failed to turn off the clutch pump after he initially engaged and when he applied the rotor brake upon disengaging, the clutch warning light went out. When the brake was released as requested by the mech, the clutch engaged the rotors, for the clutch had been left in the ON position. Fortunately, the brake was applied causing no injury.

Failure to use the checklist was the cause.

Reader Questions Headmouse Answers

Have you a question? Send it to Headmouse, U. S. Naval Aviation Safety Center, Norfolk, Virginia 23511. He'll do his best to get you and other readers the answer.

Flight Suits

Dear Headmouse:

I read an article in Personal/Survival Equipment Crossfeed, April 1965, concerning discontinuance of the high visibility flight suit and procurement of a new suit. I request that you forward to the BuWeps desk responsible for such procurement the following comments:

a. The small zippers (especially the main, center zipper) now used on at least one of the current makes of orange flight suits have a tendency to jam frequently by running over the material on either edge of the zipper. The large zippers which were used several years ago, although possibly uncomfortable at times, never jammed to my knowledge.

b. The current flight suits seem to be dimensioned too short from shoulder to crotch (body length). This comment has been heard from several pilots. The sleeve and leg lengths can be quite adequate, even too long; yet for many people, the suit feels uncomfortable when sitting. This discomfort is especially noticed when wearing heavy underwear. Better a baggy fit than one too tight.

c. The thigh pocket zipper which opens upward often results in the spilling of items from the thigh pocket both while standing and while in the cockpit. The downward opening zipper on the old flight suit seemed to be a better arrangement.

I feel that during procurement of new suits these three comments should be evaluated.

LCDR W. S. JETT
USS ENTERPRISE (CVAN-65)

▶ Chief, BuWeps made the following comments on your three suggestions:

"a. *Slide fastener jamming*: The slide fastener quality requirements have been updated to reinstate cyclic testing. To meet this requirement the slide to teeth clearance must be reduced and controlled. The slide fastener coverings have been re-designed to become more functional and less susceptible to becoming entangled in the slide fastener.

"b. *Flight suit dimensions*: The patterns for the flight suit have been revised to correspond with current anthropometric information on the aviation population.

"c. *Direction of thigh pocket openings*: This point is highly controversial. The resolution has been to provide one pocket with a slide fastener at the top of the pocket opening along a line perpendicular to the thigh. The other pocket has an opening approximately three-quarters the length of the pocket and opens from the top.

"This Bureau is responsible for providing equipment which meets the operational requirements and is as acceptable to its user as possible within the limits of the state of the art. Timely suggestions on engineering design are encouraged and contribute to the creation of equipment which enhances user acceptance."

Very resp'y,

Headmouse

Mishap Reporting

Dear Headmouse:

I read your article "*Crusader* vs Carrier" (July) with interest. As a *Crusader* plane captain I am familiar with handling problems involved with the F-8. During our last deployment my airplane was damaged (crunched) on two occasions. Both times I was required to write out a statement for the squadron safety officer but the reports of these crunches never left the ship as required by OpNav Instructions. There were about a dozen other crunches on that ship during that cruise which I know were not reported, but cannot prove. How can we hope to stop crunches when the facts surrounding them aren't publicized?

CRUNCHED MOUSE

▶ Several informal reports such as yours indicate this problem is greater than meets the eye. While we do not pretend to have the solution we print your letter together with these comments in the hopes that we can get across a point or two concerning the importance of reporting all mishaps with the attendant circumstances. Without reports it is impossible to justify certain improvements or make recommendations. There are probably a number of reasons for reports not reaching NASC. Among these may be the desire to win an award or because a ship or squadron feels that it cannot afford to look worse than a similar unit—or that the paperwork necessary for accident reporting is burdensome.

Competition and awards are intended to serve as incentives toward accident prevention. The whole purpose of the aviation safety program is to save lives, prevent personnel injuries and to maintain a high state of mission-readiness. Once a mishap occurs our concern should be for the well-being of the individual(s) involved and for the prevention of a similar occurrence.

Changing the rules will not eliminate attempts to evade the intent of the rules; what is needed

is a change of attitude toward mishap reporting. If competition is allowed to deteriorate into a numbers game—it works against every one of us! We need well-investigated, honest, analytical reports to tell us if things are improving or where we must put forth more effort to improve them.

No award is worth the loss of another life, personal injury, loss of an aircraft or losses of mission-readiness which might not have occurred had all the facts concerning accident prevention been known.

Very resp'y.

Headmouse

Missed Approach

Dear Headmouse:

I am a mechanic in HMX-1. As soon as APPROACH comes in it is passed out to the wheels, who take them home. We on the working level never get to see one. *Help!*

ANYMOUSE

▶ See your safety officer about this situation. Distribution of the magazine is a squadron's responsibility—every man should have the opportunity to read its contents. In the event the squadron is not getting enough copies to reach all hands on the basis of one copy per 10 people, just drop us a line stating your needs.

Very resp'y.

Headmouse

Pencil Flare Gun

Dear Headmouse:

Very recently a personnel casualty occurred as a result of mishandling of a pencil flare gun. While the incident does not require a report under OpNav-Inst P3750.6E, it does deal with a piece of standard survival equipment used by all flight personnel and should be of interest to the aviation community.

Excess pencil flare gun cartridges that had not been issued to crew members were stored loosely in a desk drawer. It was subsequently decided to remove the cartridges and store them in a more secure place. A squadron member was in the process of scooping up the cartridges and placing them in a nylon bag for storage in a locker when he was addressed by another individual. Looking up, he dropped a loaded, although uncocked pencil flare gun. The gun landed cartridge-first as indicated by residual powder and burn marks on the deck (Photo 1). The charge ricocheted from

Photo 1

the deck and struck the visitor on the bridge of the nose producing a severe lesion. In addition, the burning charge produced burns of the left eye.

Afterwards, the squadron member was unable to remember even seeing the flare gun. It seems possible that in addressing his visitor, he was, in fact, unaware that a flare gun was in the drawer loaded or not. Investigation also revealed that it was unlikely that the squadron member was personally responsible for having loaded a flare gun, but the careless storage and lack of security may have encouraged someone to play with the pencil flare and leave it in the drawer in a loaded condition.

Appropriate steps have been taken to insure safe storage with handling limited only to those specifically designated. Although the dangerous nature of the pencil flare gun has been reemphasized to all flight crew personnel, the likelihood of accidental detonation has been essentially eliminated by providing a special rubber-backed canvas bag for storing the gun and several cartridges in separate compartments.

Because flight personnel outside this command have been observed carrying loose cartridges in flight suit pockets, it may be timely to reemphasize the dangerous nature and proper handling of the innocuous looking pencil flare. *Do not carry a loaded pencil flare gun. Do not carry loose cartridges in flight suit pockets.*

COMMANDING OFFICER
VAP-61

▶ You are absolutely right—this device is a *gun*, and any device which can shoot a signal 300 ft straight up should be treated with the same respect as your .38 cal. revolver. *Ordnance Publication 2213, Change 4*, contains safety precautions for this type device (a new revision covering the Mk 79 Mod O should be available in October.) It states, "Signals are to be placed in the projector only immediately before firing." These projectors do not have any positive safety devices which would prevent accidental firing and a loaded flare gun will function if dropped and jarred *(reference July, 1965, Ordnance Crossfeed)*. Spare cartridges and kits should be stowed as pyrotechnics in the squadron's magazine or ready service lockers.

A previous incident which occurred during fleet evaluation of the gun apparently caused no injury other than aging all concerned a few years. A pilot was running down the flight deck to man aircraft when a cartridge in the lower leg pocket of his flight suit detonated by percussion. (Photo 2.) The cartridge and three others

Photo 2

were enclosed with the projector in the original plastic bag. The projector was not loaded. The expended cartridge had a slight but definite indentation on the percussion cap.

The Mk 79 Mod O will be delivered to fleet squadrons shortly. All personnel carrying these signals *must* be aware of the safety precautions necessary.

Very resp'y,

Headmouse

COLD FACTS

• When landing on a runway covered with ice or snow or where directional control is less than usual, plan to touch down in the center of the runway. Increased landing interval will permit this in formation breakups.

▸ One of the gadgets subject to "bollixing" by winter weather is the altimeter. You may be tooling along at a comfortable indicated terrain clearance altitude, and actually be at mountain-peak level. For every 10°C difference in temperature from the standard a four-percent error in indicated altitude occurs. Low temperatures cause the airplane to be lower, lower than the altimeter says, that is.

• For jets operating in doubtful weather, more than one alternate should be considered in flight planning, with fuel as one of the primary considerations.

▸ Depth perception in snow covered areas is deceptive; a runway clearly visible from above can disappear on final approach and flare due to a lack of contrast between the runway and the surrounding terrain. Glare can also distort depth perception. A GCA-monitored landing, if available, lessens this problem.

• The veteran jet pilot says: "Make a really careful check of radio equipment and of all radio facilities available. It's only common sense under winter conditions."

▸ Freezing rain is almost invariably associated with a shallow layer of cold air on the ground with overrunning warm air above, where temperature may be in the 40s or even 50s through a narrow layer around 3000-6000 ft.

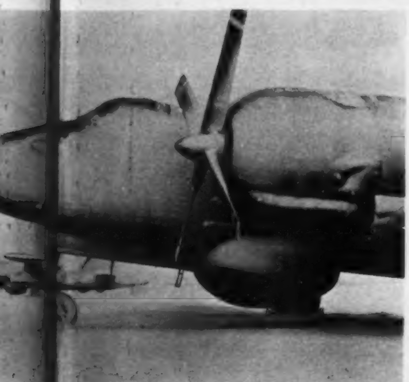
• Since rime ice usually forms on the wing leading edge, the aerodynamic efficiency of the wing is not greatly impaired. And since it is granular in makeup, you stand a better chance of its breaking off in large chunks.

That wide summer runway may be restricted by winter snowbanks. Do you know standard distance from dashed centerline to solid side stripe?

Unseasonable Florida ice festoons an A-4. Forecast said rain but no freezing so Duty Officer did not stack hangar. After midnight temperature dropped rapidly. Heat from idling A-4 was de-icing method.

Scenic but inhospitable: Wear or have equipment compatible with ground environment.

PALM TREE DUTY IS NO GUARANTEE AGAINST WINTER HAZARDS; REMEMBER THOSE FREAK STORMS AND FLIGHTS TO NORTHERN LATITUDES



Review the tactics you might use if you had to live in these Nevada hills for a few days (above).

Snow covered airplanes and ramps (left) can delay the flight schedule but heed an ancient aeronautical proverb: "haste makes waste."

▶ With clear ice, more care is needed. Since it is highly tenacious, it must be broken off before it reaches a strength where the boot cannot expand. If corrective action is taken too soon, the ice will merely crack along the line between the inflated and deflated sections of the boot and will not be eliminated. About one-fourth to one-half inch is the correct thickness to begin boot operation.

• Icing on props is indicated sometimes by engine vibration and loss of airspeed due to decreased propeller efficiency.

▶ Propeller icing is especially dangerous and no amount should be allowed to remain under any circumstances. Alcohol anti-icing systems will not remove ice already formed, hence all propeller deposits should be removed before starting engines.

• If high relative humidity and freezing temperatures exist, anti-icing systems should be operated immediately after starting and during warmup, taxi, takeoff and in flight whenever visible moisture exists or icing is suspected.

▶ The Beechcraft factory reports that cases of icing fog have been encountered which would ice up a propeller in a mile of taxiing plus ordinary warmup time.

• Pitot heaters may be checked before starting by turning the heater ON and feeling the tube for warmth. Heaters should *not* be left ON for more than 30 seconds of ground operation or the element may burn out.

▶ Exposure to carbon monoxide increases in winter as aircraft heaters are used more frequently. Give special maintenance attention to heaters and cockpit seals before cold weather sets in.

Distinguished Safety Achievement Fiscal 1965

Major Commands recognized the following units for their significant contributions to the overall safety program. The Annual CNO Award Winners were listed in the October issue.

CNARESTRA

VA-732
VA-741
VA-771
VA-772
VA-776
VA-811
VA-813
VA-831
VA-832
VA-873
VA-876
VA-879
VA-891
VA-892
VA-912

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VF-702
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HS-892
HS-911
HS-931
HS-932

CNATRA

VT-1	VT-7	VT-29	NATTU Pensacola
VT-6	VT-28	VT-30	USS Lexington (CVS-16)

CG MARTC

VMA-123	VMA-142	VMF-111	VMJ-4
VMA-124	VMA-144	VMF-112	VMO-4
VMA-132	VMA-221	VMF-441	VMR-216
VMA-133	VMA-233	VMF-511	VMR-222
VMA-134	VMA-241	VMF(AW)-113	VMR-234
VMA-141			VMR-353

HMM-764	HMM-768	HMM-772
HMM-765	HMM-769	HMM-776
HMM-766	HMM-771	HMM-777
HMM-767		

CG FMFLANT

VMA-332	HMM-265	H&MS-31
VMA-(AW)-242	H&MS-14	H&MS-32
VMFA-115	H&MS-24	HMH-461
MAMS-27	HS FMFLANT	

CG FMFPAC

VMA-121	VMO-6	H&MS-11	H&MS-16
VMA-214	HMM-164	H&MS-12	H&MS-33
VMCJ-3	HMM-261	H&MS-13	MAMS-17
VMFA-314	HMM-364	H&MS-15	MAMS-37
VMGR-152			HS FMFPAC

COMNAVAIRLANT

VA-12	VP-5	VP-24	VS-27
VA-36	VP-7	VP-26	VS-28
VA-45	VP-8	VP-30	VS-36
VA-64	VP-10	VP-44	VS-39
VA-65	VP-11	VQ-2	VW-4
VA-75	VP-16	VR-1	VW-11
VA-76	VP-18	VR-24	VX-1
VA-85	VP-21	VRC-40	HS-1
VAH-6	VP-23	VS-26	HS-7
VAP-62			HS-9

COMNAVAIRPAC

VA-52	VAH-10	VP-31	VS-35
VA-96	VAP-61	VP-46	VS-38
VA-112	VC-1	VP-47	VS-41
VA-115	VF-114	VP-50	VW-1
VA-126	VF-213	VQ-1	VX-4
VA-127	VP-4	VR-21	VX-5
VA-144	VP-6	VS-23	HS-2
VA-146	VP-19	VS-25	HS-10
VA-165	VP-22	VS-29	BARONPAC
VA-195	VP-28	VS-33	

MAN

THE KNOW

Accidents, basically, are caused by only two factors, people and things. The simplest kind, as has been repeatedly demonstrated, usually involve things. Things can often be modified to the point that their reliability becomes extremely high. When man is considered, however, it has become popular to indulge in long erudite discussions of the fact that he was the same, is the same, and will remain the same and that his inherent failings are such that no real hope exists for either explaining or decreasing his contribution to accidents.

OWN FACTOR

By ANCHARD F. ZELLER, Ph.D
Research Psychologist, USAF

The Man and the Machine

The entire field of human engineering has grown from the recognized fact that, in addition to basic functional reliability, the machine's operation must be compatible with man's ability. Aircraft cockpit designs have developed through both logic and trial and error to the point that many of man's frailties have been specifically considered in the design of equipment. It is agreed that controls must be within reach, instruments visible, presentations meaningful and known incompatible interrelations between instruments and controls avoided. The fact that man's span of attention is limited is recognized and its parameters reasonably well documented. In the light of this known information, if a cockpit should be designed which contains 114 warning lights, it can only be said that the designers are inviting accidents for there is no evidence to indicate that man was ever capable of adequately monitoring such a number. If painfully developed knowledge is flagrantly disregarded certainly accidents must increase.

The Man in an Environment

The man and the machine, either separately or as a unit, operate in some environmental setting. This setting always involves two features, one of which is location and the other is time.

The fact that man operates in time is one of his most important limiting factors. This is brought most forcibly into focus in the area of see-and-be-seen flying. Space can be covered so rapidly in high performance aircraft that by the time an oncoming collision object can be physically seen it is too late to initiate the actions required for its avoidance.

Some years ago a simple, unpublished experiment was conducted in which a slow moving C-47 was used to avoid a collision with a vertical light beam from a theodolite. The pilot who was to avoid the collision was given control of the aircraft at various known distances from the beam. The unequivocal findings, of great surprise to both of the experienced Air Force pilots involved, was that a minimum of nine seconds was required for successful avoidance even with the ideal conditions under which the experiment was conducted. When high performance

aircraft are converging at rates well in excess of 1000 miles per hour, this nine seconds means that the avoidance of a midair collision cannot be left up to either pilot.

Midair collisions continue to be experienced. The requirement that a pilot with his limited vision be responsible for enroute avoidance is completely unrealistic. The fact that accidents will continue to occur in this area results not from lack of knowledge but the failure to accept information which is well-known and well-documented.

Time as a variable is not always a matter of split seconds. It is documented that the day of the week is a factor in accidents. In aircraft, lower rates are experienced at the beginning of the week with a gradual increase toward the end. Accidents reach a high plateau on weekends with a sharp drop for the beginning of the next week.

Another time variable of importance results from the fact that man has built-in psychophysiological cycles of sleep and wakefulness which cannot be violated with impunity. Disruption of these built-in physiological rhythms which follow the rapid crossing of many time lines creates disruption of rest cycles, fatigue and consequent inefficiency.

Time also plays a factor when an individual is in a hurry to accomplish some often unnecessary end such as getting home at a specified time or a more important one such as getting an aircraft prepared for an operational mission. In either case the attempts to crowd too many activities into too short a time period result in difficulties.

Implicit in most time considerations are space factors. Space as an environmental consideration varies from the often extensive external operating environment of a vehicle to the sometimes highly restricted work space which the operator must occupy in its operation. The hazards of high altitude as an operational environment are well known. The fact that man needs certain terrestrial equivalents is equally well known. Modification of the outside environment makes meeting these requirements more difficult but does not change them.

Not all operational environments are as glamorous as space. The mechanic in the machine shop is surrounded with many hazards, yet his most frequent injuries involve broken toes and strained backs. Individuals exposed to toxic environments certainly need protection, yet the most prevalent difficulties relate to common hydrocarbon compounds rather than the far more toxic materials to which they may be exposed.

In terms of work space itself, it is axiomatic that this should be adequate. Yet, cockpits are designed which make it almost impossible for the individual to operate adequately if he wears protective clothing (such as the pressure suit) which is required because experience indicates that the machine itself may not be reliable.

These things are known. Also known is a great deal about the man himself.

Man's Limitations

Some of the things about man which have been clearly documented are quite abstract, others much more readily measurable. It is known, for example, that man reacts to rewards and punishments. He finds punishment distasteful, but needs and is encouraged by rewards. He has other abstract needs; the need, for example, for relaxation. This need can lead him into many accident producing situations. When associated with sports activities it increases his potential for accidents, particularly if these involve activities for which he is not prepared.

Man also becomes inefficient from the results of his own activities. Although controversy rages as to what fatigue is and how to measure it, there is certainly no question that it is a very real phenomenon and that common sense rules can result in greater efficiency with less possibility of accidents. The human body is also impaired at times because of illness which produces inefficiency in varying degrees. Sometimes the very medication aimed at restoring the individual to health results in additional impairments which greatly increase the individual's potential for accidents.

Aside from the psychophysiological limitations which can be reasonably well documented, man has a variety of functional limitations. The human visual system does not estimate vertical height nor rate of closure with a great deal of accuracy, yet every landing requires that these estimates be made. The result is that periodically overshooting, hard landings, or other mishaps occur. Mechanical aids are definitely required in this area. They vary from the simplest which merely require that the individual land with sufficient leeway so as to take his inefficiency into account, to the much more sophisticated coupling systems which may eventually accomplish the landing process with man acting as a monitor.

There are other functional limitations. Some individuals have greater aptitude for some types of activities than others. Greater efforts at defining the function to be performed and selecting the individual to perform it can certainly contribute to improving efficiency and decreasing the number of accidents. Functionally, man does not ordinarily perform well

without training. Training cannot be geared to the most competent individual in a class, nor even the average, but must be aimed at the least capable if there is to be any validity in the assumption that the information presented has been learned. Once training is accomplished it is of no value unless employed. An individual trained in one specialty and utilized in another can certainly not be expected to be particularly efficient or safe. Memory is not perfect. In any activity, review is necessary, whether it be the problem of currency in flying, the launching of a missile, or loading munitions. If the activity is not accomplished with sufficient frequency, both the knowledge of how to perform the activity and the skill with which to do it will decrease. Some people can not learn some things, but even if the activity can be learned, the human system cannot be overloaded. A current problem relating to the number of different munitions which an individual can load points up this clearly. Although learning any one of the systems is completely within the capabilities of the individuals concerned, to expect such an individual to remain proficient in loading a great number of different kinds at the same time is completely unrealistic.

Training is ordinarily associated with close supervision. It is also associated with high accident potential. Learning is not accomplished without errors. The most hazardous period, however, often immediately follows the release from training. Pilots in their first operational assignment, released from the supervision of the training command, and expected to fulfill the mission in the manner of an accomplished pilot, face the highest accident potential of their entire flying career. This is the period which demands the greatest attention.

Not only is original learning fraught with accident hazard but so is the transition period. Transitions bring habits into conflict with each other which produces mistakes which cause accidents. With the passage of time rank increases and assignments change. An active pilot may find himself a desk pilot. An active mechanic may find himself a supervisor. People in these categories who attempt to resume their original function will find that inefficiency has crept in. It is easily documented, for example, that desk pilots have a higher accident potential than pilots who fly the mission aircraft regularly.

The military has a system of read-and-initial for literally mountains of material. The man's initial implies that he has read and understands the materials and on the basis of some unheard of ability is expected to remember it. Information is not absorbed in this fashion. As long as safety is based upon blind faith in methods so completely in opposition to known human abilities, accidents will inevitably continue to occur.

In addition to all of man's other limitations, he has emotional disturbances. Although the exact effect of these upon efficiency remains a subject of discussion, there is certainly no doubt that an individual with known emotional disturbances should not be expected to continue in his normal functions, particularly if these involve high risk situations. Everyone has a breaking point and although the individual who has been relatively stable is quite likely to remain that way, this cannot be accepted as an operating principle. Even as machines wear out and break, so does the human body and the human mind. There must be a constant surveillance over all people at all times. It should also be accepted that men are much the same whether they are supervisors or workmen. The supervisor must not only recognize the limitations of his men but recognize that these same ones apply to him.

Systems don't just happen. They have to be carefully designed, put in motion, directed and maintained. Very careful supervision of all facets of an activity is required if it is to remain in effect.

What are the implications of this, by no means exhaustive, listing of man's assets and limitations? It is aimed at demonstrating only one point. A great deal is known about the human. There is flagrant disregard for much of what is known. Accidents will continue until these known features are taken into active consideration.

Man in the Future

Regardless of the area considered, it appears that the future will involve no decrease and in all probability an increase in potential for accidents. Fortunately, however, it is the same man about which a tremendous amount is known. If this knowledge is applied, and if additional knowledge is developed, accidents can certainly be prevented. If systems are set up which are in direct conflict with what is known about man's limitations and safe procedures, accidents will surely result. To hold a safety officer responsible for accidents under such conditions is as unrealistic as directing that no accidents occur. Man has been and must continue to be the focal point of the accident prevention program. If there is a realistic desire to prevent accidents his limitations must be recognized, accepted, and incorporated into the overall plan. If this is done accidents will inevitably be prevented.

—*Aerospace Safety*

Short Snorts

Knowledge is one thing that doesn't become second hand when used.

—Era

Hot Start—er

A power loss occurred in the no. 2 engine during letdown and the pilot applied full throttle on both engines. After stabilizing the SH-3A at 70 kts, he observed no. 2 engine to be fluctuating between 20 and 40% NG with a corresponding T5 of 350-400°C.

The copilot was instructed to try emergency throttle.

After returning the speed lever to ground idle, he moved the emergency throttle through the slack range and about ¼-inch further. T5 pegged at 1000°C at this time and the copilot shut down the engine with the speed selector lever. The emergency throttle remained slightly cracked open.

While continuing his approach to an emergency field the pilot called for an airstart. The copilot aborted this attempt when T5 reached 1000°C. A single-engine run-on landing was made without difficulty.

During taxi off the runway smoke was observed coming from the no. 2 engine intake and exhaust. Actuation of main and reserve fire bottles had no apparent result so the aircraft was stopped, secured and evacuated.

Source of the smoke was the no. 2 engine starter, which showed evidence of extreme heat. The smoke dwindled and stopped shortly after aircraft power was turned off.

The copilot could not remember if he had secured the starter after aborting the "hot" airstart.

Cause of the initial power loss was undetermined pending findings of a DIR. However, it is suspected that fourth stage stator vane failure (stator vane being open) was responsible for the engine damage.

The 1000 degree C T5 was probably a result of using emergency throttle to bypass the fuel control, thus putting fuel directly onto an engine that already had a disturbed airflow caused by compressor damage.

Leaving the emergency throttle slightly open could have contributed to the hot airstart, since this condition bypassed the metering features of the fuel control. Under the circumstances, however, a hot start would have been most likely anyway because of damage within the engine.

It is unlikely that the airstart caused additional engine damage, although an incomplete shutdown resulted in the starter being left engaged and eventually becoming overheated.

"Failure to secure the starter in an emergency without a checklist is considered highly probable," according to an endorser, "due to the various distractions confronting the pilots at this critical time." Accordingly, he recommended the following proposal as an addition to the NATOPS emergency section pertaining to single engine restart during flight. *"NOTE*: If a 'hot' or 'hung' start occurs, check the starter disengaged on shutdown."

The pilot's decision to land his aircraft at the nearest suitable airfield was entirely correct. In the past, emergencies have been needlessly compounded during attempts to get the aircraft back to home base.

Trouble, Fore and Aft

A number of naval air stations and bases throughout the world have local warning areas associated with them for the purpose of providing a space in which aircraft and ships can conduct live firing exercises.

Locally based aircraft know these areas, but they, as well as visitors, sometimes become preoccupied with other matters and do stray close or actually penetrate such areas.

There are more than the obvious hazards of gun fire to be concerned with. Take the matter of targets.

As a matter of self preservation,

tow pilots like to have these targets pretty far behind them. This distance will vary with the type of firing to be done. When you see a yellow and blue *Stoof* towing, you can expect the target to be trailing behind it at about 7000 ft, and 1000 to 2000 ft below it, depending upon the airspeed and angle of bank of the tow aircraft.

In the case of the F-8D tow birds, safety spacing is provided by about 20,000 ft of streamed cable. Due to the higher *Crusader* tow speeds, this cable droops only about 2000 ft below the low plane altitude.

Since, in the case of some ship firing, the target is often supposed to be at 1000 ft altitude, there isn't much room to go beneath. So if you observe a possible tow aircraft, *don't* expect to *see* an escort and *do* make it a habit to keep well clear of the area beneath and aft of him if either of you are anywhere near a zone.

Clearance on Request

It's sometimes a bit of a letdown to wait in line for an IFR clearance instead of scrambling with the rest of the locals.

But it often helps to see the other fellow's problems. FAA facilities survey peak loads, and the following are of professional interest:

"On the composite peak day, nearly 24,000 IFR (Instrument Flight Rules) flight plans were filed with FAA facilities. Multi-engine recip aircraft (12,500 pounds and over) filed 9716 IFR flight plans; turbojets, 6668; multi-engine recip aircraft (under 12,500 pounds) 3364; turboprops, 2590; single-engine aircraft (4-place and over) 998; single-engine (one to three place) 373; and rotor craft, 153.

"Most aircraft (69 percent) were assigned to low altitudes—up to 14,999 ft. Nine percent were assigned to altitudes from 15,000 to 23,999 ft, and 19 percent to flight levels 240 and over. Ninety-nine percent of the high level flights were turbojets.

"The six busiest FAA air route traffic control centers on the composite peak day were: New York, 1716 IFR departures; Washington, 1356; Chicago, 1341; Fort Worth, 1117; Los Angeles, 1076; and Atlanta, 999 . . ."

Pilot Weather Reports (Pireps)

. . . In addition to complete Pireps, pilots can materially help round out the in-flight weather picture by adding to routine position reports, both VFR and IFR, the following phrases as appropriate:

on top
below overcast
weather clear
moderate (or heavy) icing
moderate, severe,
  extreme turbulence
freezing rain (or drizzle)
thunderstorm (location)
between layers
on instruments
on and off instruments . . .

. . . The Air Route Traffic Control Center uses the reports to expedite the flow of enroute traffic and determine most favorable altitudes.

—*FAA Airman's Information Manual*

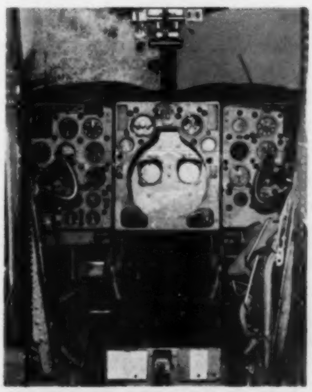
Safety glass shattered into . . .

Bird Strike Downwind

The TS-2A flew into a large flight of vultures while downwind in the touch-and-go pattern.

One bird struck the pilot's windshield, shattering the glass and showering the cockpit with glass fragments. The windshield was only partially torn loose, but the inner lamination of safety glass shattered and was thrown over the entire cockpit.

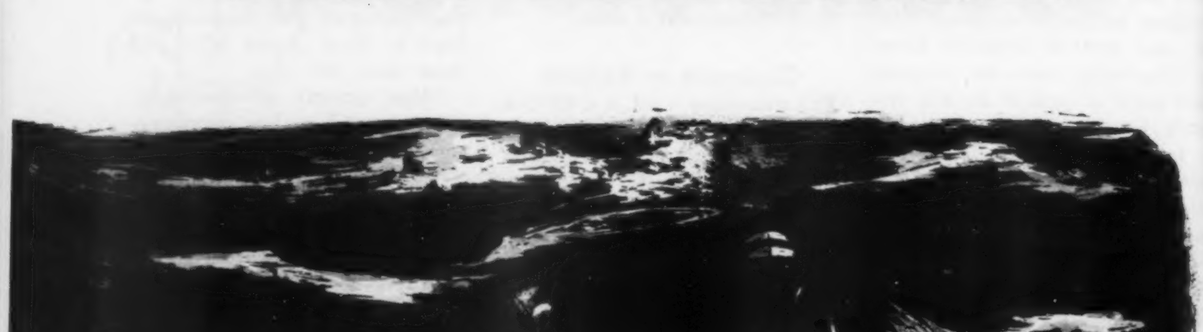
Of interest is that both pilots' visors were down at the time of impact, possibly preventing serious injury to their eyesight.



. . . the cockpit

Notes from your Flight Surgeon

SUIT YOURSELF



IN the survival period following the crash of an S-2A on anti-submarine maneuvers, air trapped in the top of the injured pilot's Mk-4 anti-exposure suit kept him afloat until help came. His right arm was broken in the crash and his left arm was tangled in his life vest. He yelled for help and one of the two crewmen swam to him, pulling the Mk-4 life raft.

The raft could be inflated only partially because of holes in the CO_2 compartments. The crewman tried to inflate one side of the pilot's life vest but the CO_2 escaped through a tear. The pilot, too weak to get into the raft, was held alongside with a lanyard secured to him until rescued by submarine.

Water temperature was 45° and air temperature was 53°. The pilot had been in the water 22 minutes when rescued. Apparently he did not suffer from exposure although rips in his anti-exposure suit caused it to take on water. He was wearing the complete suit liner. During egress his suit mittens fell out of his pockets and were lost.

One of the crewmen was wearing only the top of the winter flight suit under his Mk-4 anti-exposure suit. He was in the raft 10 minutes and in the water 25 minutes. After rescue he was so cold he couldn't stop trembling or stand on his feet for an hour and a half.

The second crewman wore the complete inner liner under his anti-exposure suit. Although his suit took on some water and he spent the same period of time in the water and the raft as the first crewman, he was not cold except for his bare hands.

Raft Inflation

DURING the parachute descent, an F-8E pilot inflated his Pk-2 pararaft as well as his Mk-3C life preserver. He noticed at the time that the raft inflated to only half capacity. As he let the raft drop, wind currents swirled it wildly about his head. Fearing it would tangle in the parachute shroudlines, he pulled it in and held it during the remainder of his descent. When the raft's sea anchor tangled around one of the parachute risers, he cut the lanyard with his survival knife.

By touchdown, the raft had completely deflated so after getting rid of the parachute, the pilot got rid of the raft. Helo pick-up took place a few minutes later.

Comment: If you are equipped with a "soft pack" such as this pilot had, you *should not* inflate your raft during parachute descent. Pilots and RIOs equipped with hard packs (rigid seat survival kit) *should* inflate the raft during parachute descent by pulling the kit release handle. The lower half of the kit drops away but remains attached to the raft, acting as an "anchor" during parachute descent. Once in the water, immediately attach the raft retaining line snap hook (incorporated by Clothing and Survival Equipment Bulletin 36-62) to either shoulder rocket jet fitting of the torso harness or to the rescue lift ring. After boarding the raft and securing your equipment, you then can cut the lanyard connecting the lower half of the kit and the raft or you can leave it attached.

Spot Checks

RECENT spot checks of personal safety/survival equipment revealed that a number of personnel are wearing dirty and torn flight suits, do not carry either the PSK-2 or SEEK-1 survival kits, do not have the sheath knife enclosed in a pocket sewn to the flight suit (jet pilots excepted) and do not have reflective tape on their helmets. With the cruise periods coming up soon corrective action must be taken immediately.

Comment: When you need them you need them. . . .

—*NaResTraCom Bulletin*

Improper Dieting

AN MOR reports the case of a pilot on an improper self-imposed diet. He skipped breakfast and lunch and subsisted entirely on one meal a day. It was pointed out that 1) this type of a diet is not good for a person faced with an extended tense situation and 2) it didn't work since the pilot did not lose any weight.

Action: Each squadron should insure that all flight crew personnel are aware of the hazards of "self-dieting." If a diet is required, a flight surgeon should be consulted.

—*Aviation Safety Committee*

Sun Visor

DURING pullout after a normal strafing run in rocky terrain, an A-4C ran into its own ricochet. Part of the port windscreen was shattered. The pilot climbed and returned to base. He stated that having his sun visor down definitely prevented eye damage and possible temporary blindness which could have necessitated ejection.

PRT-3 Signal

A RADIO beacon signal of very short duration was heard on Guard Channel and recognized by four pilots. "Not one reported it until after it was learned that a problem might have existed," the aircraft accident investigators wrote in the AAR. The signal from a PRT-3 was activated when an F-8B pilot ejected over water. He was in the water two hours and 26 minutes—without a raft—before being picked up by rescuers who spotted his dye marker.

Why didn't the four pilots report the signal immediately? The AAR gives three reasons: the signal's brevity, the length of signals during other actual emergencies and the fact that such signals had been heard before in accidental transmissions.

"Notwithstanding," the AAR states, "the signal should have been reported. Because *all* pilots did not *immediately* report it, doubt and delay concerning its authenticity was promoted."

The ejection sequence consisted of a splendid series of bangs, explosions, tugs and jerks—acceptable if not downright pleasant!

—A-4 Pilot

Tire Servicing

When servicing aircraft tires the lack of know-how can kill you. Here are facts every plane captain and mech should know:

Aircraft tire inspection and maintenance have become more and more critical through the years because of increased aircraft weight and higher landing and takeoff speeds. Also, the use of tubeless tires has introduced many new conditions that require more exacting maintenance procedures to insure reliability. Inspections are necessary to insure that unsafe tires will be replaced before flight, that sound tires with minor defects will not be removed prematurely, and that worn tires will be removed at the proper time to permit recapping.

Before each flight, look at the tires for obvious damage that may have been caused during or after the last previous flight. During the first preflight inspection each day, closely inspect the tires for the following conditions:

- Correct air pressure.
- Defective valves.
- Tire slippage (if tire slippage marks are required) Ref: NavWeps 04-10-506.
- Extent of tread wear.
- Uneven tread wear.
- Flat spots.
- Tread separation.
- Cuts and embedded objects.
- Blisters.
- Bulges.
- Weather checking.
- Contaminating fluids.
- Skid spots.

Inspection Procedures

Inflation Pressure. Maintaining the correct inflation pressure in an aircraft tire is one of the most necessary factors in obtaining maximum safe service life. Inner tubes and tubeless tire liners used in most commercial and private automotive tires are made of butyl rubber. Military aircraft inner tubes and tubeless tire liners, on the other hand, are made of *natural rubber* to satisfy extreme low temperature performance requirements. Natural rubber is a poor air retainer when compared with butyl rubber. This accounts for the comparatively high daily air pressure loss and the need for frequent pressure checks with military aircraft tires.

Underinflation. Underinflation increases the tread contact area, causing the tire to wear rapidly and unevenly at the outer edges of the tread. An underinflated tire develops higher temperatures when flexed than a properly inflated tire and this can result in tread separation or a blow-out.

Overinflation. Overinflation reduces the tread contact area, causing the tire to wear faster in the center. Overinflation also increases the possibility of bruise damage to the cord body on impact with foreign objects on the runway.

Use only approved equipment for servicing tires. Whenever booster pumps or air bottles are used as a source of air pressure, and the output of the pump or pressure in the bottle exceeds 500 psi, a pressure reducing regulator must be used to provide a controlled line pressure not to exceed 500 psi. *Do not attempt to inflate tires with the tire valve attached directly to a pressure source of greater than 500 psi.* Check the air pressure frequently during inflation with an accurately calibrated air pressure gage. Do not depend on the pressure regulators of servicing equipment for determining correct tire inflation pressures. Use caution at all times; *an overinflated tire is as dangerous as a live bomb.*

Maintaining Correct Tire Pressure. At least once

Incorrect! (See Letters page 46)

A. Skid spot caused by too rapid brake application

B. Rapid tread wear caused by overinflation

C. Rapid tread wear caused by underinflation

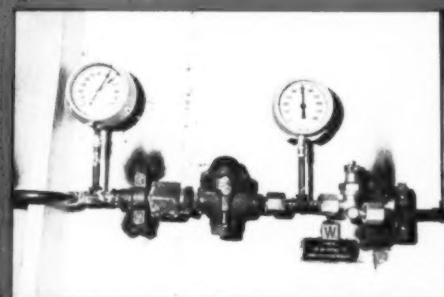
each day, check and correct the pressure of tires installed on operating aircraft. Check and correct the pressure of tires installed on inactive aircraft once each 48 hours. Do not tow or taxi any aircraft with underinflated tires. For correct tire pressures, refer to the Manual of Maintenance Instructions applicable to the aircraft. For checking and inflating tires, use only approved compressors or air bottles and only gages conforming to Class C of Specification Mil-G-8348C(ASG).

Excessive Pressure Loss. When a wheel assembly is suspected of having excessive air pressure loss, adjust the pressure to the required operating pressure. Allow to stand 24 hours, then check the air pressure again. If the pressure loss exceeds five percent of the required operating pressure, remove the wheel assembly, and determine the cause of the leak.

Temperature changes affect tire pressure, therefore, a correction factor must be applied to compensate for changing temperature. A 5° F temperature increase will increase tire pressure about one percent and a 5° F temperature decrease will decrease tire pres-

Anymouse Reports

Use of deck edge high pressure air coupled with an improper air servicing unit caused A-3's tire to explode.



Shipboard air servicing lines used for tire inflation require reducing valves limiting pressure to 500 psi.

Does your tire man use high pressure air to inflate low pressure tires? Maybe so and he's getting away with it. Our man got away with it, no telling how many times, for about seven months, then . . .

He is now taking a long rest in a hospital with a broken leg and a deep laceration on his leg—too close for comfort.

How many times has this story been told I wonder? This particular case is just one of downright disregard of common sense. The man admitted that he knew it was an extremely dangerous thing to do and had been warned of the dangers many times by his Chief and Division Officer. He had read the various directives and safety precautions concerning all aspects of tire maintenance and was thoroughly familiar with the locations of the air outlets. He was informed that the nose wheel needed inflation the day before and was not rushed.

It happened 45 minutes before the aircraft launched on the first day of air-ops after a 10-day in-port period. The air bottles needed topping off too, so why not use the same air? This would save him from the trouble of getting an additional extension to reach from the low pressure tire inflation outlet at a different location.

This was a piece of cake. He'd used HP air on tires before. All he had to do was turn the square nut on the valve with a crescent until he heard a whistling noise come from the tire, turn the valve back a hair 'till the noise barely stopped then watch the tire for the "right look," shut the valve, remove the hose and check the pressure with his portable gage.

Just as the tire reached the "right look," BANG! He is lucky to be alive. Prevention of a similar occurrence should be obvious.

ANYMOUSE

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sure about one percent.

When a tubeless tire and wheel assembly is found to be leaking excessively, first examine the wheel, wheel seals and valve for defects. If no defects are found or if the excessive leaks continue after all defects have been corrected, dismount and examine the tire.

Inspect tire valves for the presence and proper fitting of valve caps, and for slow leaks, damaged threads, and position and condition of the valve stems.

Valve Caps. Each tire valve must be fitted with a valve cap screwed on fingertight. The cap prevents moisture, salt, oil and dirt from entering the valve stem and damaging the valve core. It also serves as a secondary seal if a leak should develop in the valve core.

Slow leaks. When checking tire pressures, check the valve for slow leaks by putting a small amount of saliva or water on the end of the valve and watching for air bubbles. If bubbles appear, replace the valve core.

Damaged Threads. Inspect the valve for damaged threads. Damaged threads may cause the valve cap or valve core to fit improperly. Minor thread damage may be repaired with a Schrader No. 3263 or similar valve repair tool without removing inner tubes or tubeless tire valves from the wheel. Replace tubeless tire valves and inner tubes of tube type tires if threads are damaged to the extent that valve caps or valve cores cannot be installed properly or if the valves are damaged beyond repair.

Position and Condition of Stem. Inspect the position of the valve to make sure it is not rubbing against the wheel. When this condition is found, remove inner tubes or tubeless tire valves from the wheel, and repair by bending with a Schrader No. 3631, 3636 or similar converting tool. Usually, only slight corrective bending is required. Replace tubeless tire valves if the valves are badly bent, cracked or worn. Replace valve extensions if cracked, bent or damaged.

Slippage marks are required on all tube type tires inflated to less than 150 psi and on helicopter tube type tires.

Tire Slippage. Inspect each wheel daily if marked for indication of tire slippage. If the markings do not register, completely deflate the tire and examine the valve for defects. If the valve is not damaged, realign the valve, and reinflate the tire. If the valve is damaged, replace the inner tube, and reinflate the tire. Remove the old markings, and apply new ones in accordance with instructions in NavWeps 04-10-506.

Maintain tire slippage markings in good condition on all tires where required.

Inspect tire treads both for extent of wear and for abnormal wear. For guidelines refer to NavWeps 04-10-506.

Continued

Inflation cages must meet design specs. Homemade type, left, has venting feature; cage in center did not—caused injuries to operator. Cage on far right is approved type.

Nitrogen bottle carts used for tire inflation must be equipped with reducing valves limiting pressure to 500 psi.

Marking of Removed Tires. If tires are removed for defects, mark all removed tires with a tag showing the reason for removal. Outline all defects with a wax crayon to assist screeners in determining final disposition of removed tires. Do not use paint or lacquer for marking defects as this may damage the carcass beyond repair.

Tire Dismounting

Tire Deflating. All aircraft tires must be completely deflated before any attempt is made prior to removing wheel from aircraft axle. Failure to do so can result in fatal injury to personnel.

When a tire has been completely deflated and set aside to await the bead breaking operation, the valve core shall be removed and a deflated tire flag (as shown in fig. 5-1 of NavWeps 04-10-506) installed on the valve stem to show that the tire has been deflated and the valve core removed. The tire flags must be so constructed as not to be installable unless the valve core or cores have been removed.

Tire Inflation

Many aircraft tires require inflation pressures above 150 psi; therefore, most standard shop low-pressure air systems cannot be used. Properly equipped portable or fixed air compressors or high-pressure bottled air or nitrogen gas may be used for inflating aircraft tires. The following precautions must be observed:

- Equip all high-pressure air or nitrogen sources with reducing valves that limit the line pressure to 500 psi maximum.
- Use only tire inflation gages conforming to Specification Mil-G-8348C (ASG) Class C, for checking inflation pressure.
- Have tire inflation gages checked for accuracy at least once every 30 days and at any time malfunction is suspected.
- *Place the tire in a safety cage during the initial inflation.* Wheel assemblies sometimes explode violently during the initial tire inflation because of defects in the wheel or tire or because of improper wheel assembly procedures.
- Make sure that the air supply line from compressors is equipped with traps to remove excess water or oil.
- Certain aircraft such as the F-4 require the use of bottled nitrogen gas for inflating tires. Make sure that the nitrogen bottle is equipped with a reducing valve that limits the line pressure to a maximum of 500 psi.

Tube-Type Tires

▶ Remove the valve core and place the tire and wheel assembly in a safety cage (see photos page 39).

▶ Attach to the valve stem a tire inflation gage assembly.

▶ Check to make sure the inner tube is not being pinched between the tire bead and the wheel flange.

▶ Check demountable flange wheels to make sure the demountable flange and locking ring are seated properly.

Caution—Tube type tires are susceptible to sidewall and tread blister formation if extreme care is not taken during mounting. *It is very important to first inflate, then completely deflate tube type tires before inflation to the required pressure.* This procedure helps to eliminate air trapped between the inner tube and tire carcass, and allows the tube to equalize in the carcass, thereby eliminating stretched and thinned tube sections. Trapped air is usually relieved by tire vent holes, tire vent ridges and inner tube vent ridges described in paragraphs 2-22 and 2-27 of NavWeps 04-10-506. But, if excessive amounts of air are trapped, if the tire venting system does not work properly or if an inner tube leak occurs, blisters may be formed between the tire sidewall or tread rubber and the tire cord body.

If blisters are detected before they exceed one-inch maximum dimension, they can be relieved by carefully puncturing with an awl. In puncturing a blister, hold the awl almost parallel to the sidewall, and pierce the blister carefully near the outer edge. If blisters exceed one inch maximum dimension, remove the tire from service.

▶ Secure the safety cage door, and inflate the tire with enough air pressure to seat the tire beads against the wheel rim flanges. Release the air pressure, and deflate the tire completely.

▶ Open the safety cage door, remove the air line and install the valve core. Re-attach the air line, and inflate the tire to the operating pressure required by the Manual of Maintenance Instructions for the aircraft for which the tire is intended.

▶ Allow the inflated tire to remain in the safety cage for at least 10 minutes before removal.

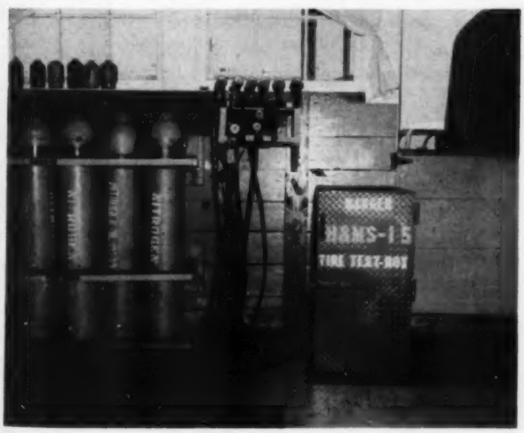
▶ Open the safety cage door, remove the air line from the valve stem and install a valve cap. Remove the tire and wheel assembly from the safety cage, and place in a storage rack for at least 24 hours to allow the tire to undergo normal stretch while at normal operating pressure.

Tubeless Tires

▶ Place the tire and wheel assembly in a safety cage and install the valve core.

▶ Attach to the valve stem a tire inflation gage.

Caution—Blisters sometimes form between the sidewall or tread rubber and the tire cord body after inflation if the tire venting system does not work properly. If blisters are detected before they exceed one-inch maximum dimension, they shall be relieved by carefully puncturing with an awl. In puncturing a blister, hold the awl almost parallel to the sidewall, and pierce the blister carefully near the outer edge. If blisters exceed one-inch maximum dimension remove the tire from service.



Nitrogen bottles in tire shops must also be equipped with reducing valves limiting pressure to 500 psi.

AF, Navy Tires Not Interchangeable

Tires made in conformance with Military Standards for Navy use are *not* interchangeable with U. S. Air Force tires of the same sizes. Military Standard tires are of stronger construction because they are required to pass special burst and bruise resistance tests that simulate carrier landing performance.

▶ Secure the safety cage door, and inflate the tire to the operating pressure required by the Manual of Maintenance Instructions for the aircraft for which the tire is intended.

▶ Allow the inflated tire to remain in the safety cage for at least ten minutes before removal.

▶ Open the safety cage door, remove the air line from the valve stem and install a valve cap. Remove the tire and wheel assembly from the safety cage, and place in a storage rack for at least 24 hours to allow the tire to undergo normal stretch.

Air Leakage Test—After the tire has been mounted on the wheel for at least 24 hours at the full inflation pressure, adjust the tire pressure to the required operating pressure. After 24 hours, check the tire pressure again. The air loss during the second 24-hour period should not exceed five percent of the operating pressure. If the pressure is satisfactory after the pressure check, reduce the pressure *to 50 percent of the normal operating pressure for storage or shipment.*

An alternate procedure may be used to avoid holding tires for the second 24-hour period. The pressure loss during the first 24-hour period should not exceed ten percent for tire sizes up to 26 x 6.6, seven percent for tire sizes 26 x 6.6 and larger, and five percent for all Type III tires. For identification of these see NavWeps 04-10-506.

Ed.'s Note—For complete details on all aspects of aircraft tire maintenance, stowage and repair instructions please refer to NavWeps 04-10-506. The viewing of film MM 9360, High Pressure Gases in Aviation is highly recommended for tire inflation training.

LIGHT WATER, Helo Speeds Crash-Rescue Fire Fighting

Complete Fire-Rescue Vehicle—Helo drops rescue team, isolates fire for pilot rescue, extinguishes 200-gal. avgas fire in 15 seconds.

THE use of a helicopter as a complete rescue vehicle was recently demonstrated when a UH-2B approached a fiercely burning wreckage in a simulated crash-fire, and completely extinguished the fire in 16 seconds. A dummy pilot was rescued seven seconds after the arrival of the helicopter.

This major breakthrough was possible by using an extinguishing agent called "Light Water" and culminated a 15-year search to perfect the helicopter as a complete crash-fire rescue vehicle. The entire development was under the sponsorship of BuWeps.

In the past, the helicopter has been used to assist rescue teams by transporting the team and a heavy, externally slung protein foam or dry chemical unit to the crash scene and to use rotor wash to help retard the flames.

With the regular protein foam, the rotor wash blows the foam off the extinguished fuel, allowing back-flash or reignition. This is not the case with Light Water. The non-toxic, water soluble Light Water is 6 to 12 times more powerful in quelling fuel fires than any other known agent. Once extinguished, the fuel cannot reignite.

The intent of the tests conducted was to adapt the helicopter as a complete rescue vehicle, primarily for inaccessible, off-station crashes. The tests consisted of 17 flights at Miramar Naval Air Station. The UH-2B helicopter, used for the tests was piloted by Chief (Aviation Pilot) J. L. Colbert of NAS Miramar and LCDR A. L. Stingl of the Bureau of Naval Weapons. All types of fires, using different fuels of varying amounts from 50 to 300 gallons per fire, were extinguished in 8 to 18 seconds after arrival of the helicopter.

By configuring the helicopter with a foam nozzle at the end of a retractable 8-foot boom, the pilot can maneuver the helicopter to completely clear a rescue path directly to the fuselage in a matter of seconds. The approach is made downwind at a height of about 20 ft. The rotor wash contributes considerably by suppressing the fire and pushing the flames and smoke away as the helo pilot approaches. Also, the Light Water is forced down directly on the fire by the rotor wash. It was found that by mounting the boom at a 45-degree angle to the starboard side, two advantages were realized. First and foremost, it placed the foam nozzle in the pilot's sight at all times and secondly, it gained a power factor by using a wind coefficient instead of hovering directly downwind.

Tests included lowering two rescue men on a quick descent device as the helicopter hovered momentarily downwind at the crash site. The rescue men immediately followed the helicopter as the pilot opened a rescue path to the fuselage. Although the rescue men wore protective clothing, extinguishment was so complete that ordinary street clothing could be used.

The relatively small amount of Light Water carried (60 gallons) for extinguishment allows a permanent installation on a helicopter by using a specially designed tank carried on an external stores rack, thereby not denying cabin space or mission capability but simply changing the helicopter to a multimission aircraft. Any number of tanks could be carried depending on the need and lifting capability of the helicopter.

With relatively little cost, all major airfields, both military and commercial, could have the tremendous advantage of this type of rescue vehicle.

BuWeps is reviewing all data developed to determine the feasibility of and action required for providing this capability to all naval activities as well as providing information to other interested military and civilian agencies.

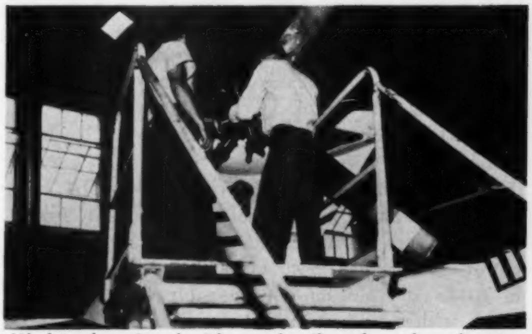
NOTES AND COMMENTS ON MAINTENANCE

The Big Payoff

THE keystone in a flight crewmember's life is quality control. The lack of adequate control has proved to be the gravestone of many an airman and is strongly suspected in the deaths of others. In this world of checks, counterchecks and balances, it is inconceivable that the ultimate check that could spell the difference in life and death is overlooked or done in such a manner as to be tantamount to criminal negligence.

Quality control is no reflection on the integrity or ability of our mechs who number among the best in the world, but the human who isn't susceptible to moments of inattention, distractions or fatigue hasn't come along yet. So our best bet is properly organized, well-supervised quality control.

Bringing home this point is the new 15-minute color film "The Big Payoff," No. MN-10003B available from your nearest Training Aids Film Library. It's strongly recommended for your maintenance training program.



Workstand equipped with guard rails reduces hazard potential to mechanics. Here mechanics check helo tail rotor hub, pitch rods and blades for cracks and security.
—HT-8 Ellyson Field

It's The Little Things That Count

"Increased knowledge does not frequently come in large amounts suddenly and in dramatic fashion. Rather, it is a gradual accumulation of bits learned daily and even hourly. . ."*—Admiral Claude Ricketts*

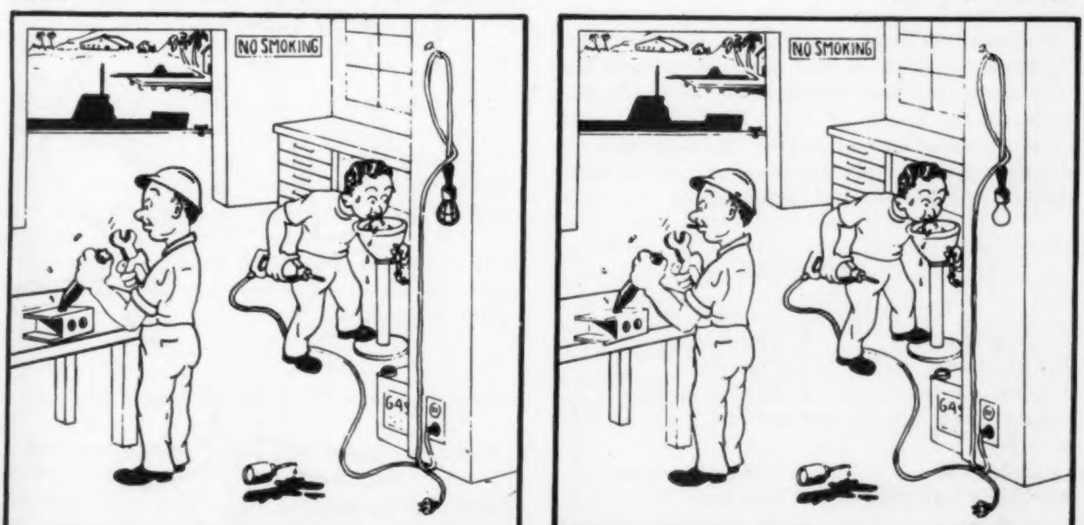
Six Differences

Here's another in the series of drawings called "Six Differences."

At a glance the drawings may look alike, but there are six variations. There also are other hazards which are the same in both drawings but these don't count. The game is to find *the* six. Can you?

See page 44 for the answers.

—OIR SAFETY REVIEW



Misuse of Nuts in Throttle Linkage

SINCE the publishing of the feature on "Throttle Disconnects" (Sept 65) a recent Flight Safety Amp-FUR reveals another hazard potential involving the misuse of locking nuts in a TF-9J. Excerpts are quoted here for information and possible action.

"Cracked 1/4-inch hexagonal nut at connection of rod assembly, bellcrank to engine control lever PN 178433-1. Crack spread approximately 1/16 inch. Second crack two flats away occurring internal threads toward out flat. Approximately 1/64 inch metal maintaining integrity of nut sections at second crack. Noticed during engine removal. Separation of power control linkage would have caused fuel control to go to idle position and possibly vibrate to idle cutoff with attendant engine flameout.

"Nut composition aluminum. Cracking probably due to overtightening on steel bolt. Further inspection of 11 assigned aircraft revealed two with aluminum body elastic stop nuts utilized at same connecting point. Further inspection of power control linkage from bellcrank assembly sloping bulkhead upper engine control PN 132633-2 to fuel control on four aircraft revealed four aluminum lock nuts utilized out of 28 nuts inspected."

Immediate inspection of power control linkages is recommended and if any aluminum nuts are found these should be replaced with steel self-locking nuts.

Hot Spot

WHILE turning up for jet-cal, a fuel line ruptured causing fuel to be sprayed over a large area; the engines were sucking up fuel from the deck and shooting flames for 30 ft. A flare was fired to signal the crash crew. The flare almost landed in the fuel—shades of the Fourth of July! Though the model aircraft involved was not reported, the lesson here is: aim the gun away from the source of fire and other aircraft, taking winds into consideration.

ANSWERS

to "Six Differences" on page 43.

1. Plugged-in drill
2. Light Guard
3. Open gas can
4. Chisel head
5. Cigarette
6. Casting on table

Four other hazards that are the same in both pictures:

1. Spilled Oil
2. Electric cord dragging on deck
3. Using wrench as hammer
4. No protective eyewear

Visibility and Vision

THE impingement of melanopolus femur-rubrum of any order of lepidoptera on any aircraft windshield can result in considerable vision restriction.

In plainer English . . . bugs splattered on cockpit windows make them hard to see through and present a very definite safety hazard. Clean cockpit windows are a *must*. A thorough cleaning to remove dirt and bugs from windows should be specified in the maintenance procedures and automatically accomplished at all origins and enroute stops of sufficient duration.

—*ASO, NAS Whidbey*

Waste/Waist Reduction

IT'S really simple: when hard type junk is spotted on our ramps and flight decks, a 90-degree bend at the main hinge, followed by the firm grip, will remove offending chunks before they become FOD.

Despite magnetic pickups, giant sweepers and other modern ramp and taxiway sanitizers, the stuff lies around. To be sure, there would be less if people will just use the old-fashioned method of pick up nuts and bolts lying around. A little bending over never hurt the waist line either.

How'll I do that 90-degree hinge bit—haven't seen my feet in years!

Inflight Repairs

AFTER LIFTOFF the UH-2A's landing gear would not retract.

Visual inspection by the crew revealed that the starboard landing gear Drag Brace Terminal End (PN 1005-88) was broken, allowing the drag brace assembly to separate from the airframe.

Suspecting that the damaged gear would collapse during a landing attempt, the pilot decided to set up a hover over the deck and call for a repairman.

The mech arrived, tools in hand, and after climbing into the crew compartment successfully accomplished the necessary repairs.

Landing was then uneventful.

Towing

THE requirements for safe towing have been stressed repeatedly. They include a qualified man on the tug; wing walkers (for night towing they should be equipped with wands); a man at the brakes with the cockpit windows open so he can hear the shouted warnings, (the hydraulic pressure should be up); painted guide lines on the ramp and in the hangar bay so the aircraft can be centered within the opening and turned in a safe arc; and a towing team chief to supervise the entire operation.

In spite of frequent warnings mechanics continue to move aircraft without a full team because they:

- are in a hurry
- are short a man or two
- haven't crunched one *yet*.

A short-handed tow crew ran into trouble trying to squeeze a 117½ ft aircraft through a 119 ft door. Despite the known tight clearance there were no guide lines on the hangar floor. The tow team chief wasn't supervising. He was driving the tug. One wing walker was out of his sight at the critical moment. There may have been a shout of warning but it wasn't heard.

Anyone who persists in moving aircraft in this manner should be prepared to explain an accident.

—ASO, NAS Whidbey

Chief to young airman: "You must be ready to jump at your opportunity."

Young airman: "How will I know when my opportunity comes along?"

Chief: "You won't. You just have to keep jumping."

Battery Boosting Hazards

A GARAGE crew was trying to start a tractor using booster cables from a truck to the tractor. The tractor had two 6-volt batteries in series and the truck one 12-volt battery. One of the tractor batteries showed no charge while the other one showed a slight charge. The cables were first connected to the truck battery. Several attempts were made to start the tractor by having one man use its starter and another man touch the other booster cable to the negative post. The battery suddenly exploded, blowing a two-inch section out of the top and spraying acid about. The man on the tractor got acid on his trousers; the man handling the cables had acid sprayed on his face and safety glasses.

The explosion apparently resulted from sparks igniting a build-up of hydrogen gas escaping from the filler caps. The following steps were recommended to preclude similar occurrences when boosting batteries: (1) remove filler caps, (2) attach cables to live battery first, then one cable to positive post of the dead battery; the other cable should then be touched to a good ground spot on the equipment to be started rather than to the dead battery ground post to be certain sparks are kept away from the battery.

Murphy's Law*

C-130

ELECTRICAL leads to the fire bottle squib, PN 800545, being the same color and approximate length led to the cross-connection of the positive and negative leads.

To prevent reversal, the reporting unit recommended that the electrical leads be color-coded and or that the terminals be of different size to identify the negative from the positive lead.

BuWeps did not concur in this recommendation because of the possibility of color code discoloration. It is investigating a maintenance test which involves the establishment of correct ohmmeter readings of (1) a correctly installed valid squib, (2) a correctly installed defective squib, and (3) an incorrectly installed valid squib.

—Contributed by NATSF.

***If an aircraft part can be installed incorrectly, someone will install it that way!**

LETTERS

Want your safety suggestion read by nearly a quarter of a million people in naval aviation? Send your constructive suggestions to APPROACH.

High Pressure Stuff

Pensacola—Warning signs are in order—Page 3 of June issue shows two men servicing a tire outside of an inflation cage. This is wrong as any AM can tell you. A man's head can be blown off should one of the tires or wheels have a defect in them.

Also on page 37 of the same issue one of the two men has his foot on the trailing edge of one of the main rotor blades. This can induce one vibration per revolution.

How *not* to inflate tires.

I have read and enjoyed reading APPROACH for many years—"Well Done" to the staff.

L. D'AMICO AMS1
HT-8, ELLYSON FLD.

• Correct in both cases. Judging from the number of reports calling the tire pictures to our attention we're inclined to think that everybody has the word. See the following letters. Nonetheless, an article beginning on page 36 deals with the tire inflation problem just in case there are some who don't know the correct procedures.

Thanks, too, for the kind words.

NAS Agana, Guam—Where is the safety cage? That nose tire is going to blow one man's knee cap loose and the other man's head off. Looks like the man is being trained for a medical.

LT J. T. BERRY

NAS Patuxent River— . . . the photo caused more of my red hair to turn gray.

• Never inflate a wheel assembly off the aircraft unless it's in a safety cage!

• Use a remote control inflation gage . . .

• Please don't use pliers on valves, gages or valve extensions . . .

R. L. STUDEBAKER AMHC
AMD TIRE SHOP

• Good dope, Chief.

NAAS Ream Field—If this is common practice in that squadron someone is bound be seriously hurt or even killed . . .

R. D. TILTON, ADJ2
HS-10

• So right!

Washington, D. C.—In the past, the Navy has experienced quite a number fatal and near-fatal accidents because improper procedures and equipment were used to inflate aircraft tires. BuWeps has developed equipment and published safety procedures which if followed should reduce the occurrence of these accidents. The safety procedures and use of equipment are covered in Training Film MM9360, High Pressure Gases in Aviation and NavWeps 04-10-506, Maintenance, Storage and Repair Instructions, Aircraft Tires. . . . In no event should the operator kneel, sit or stand over a tire during the inflating operation . . .

R. W. DREWELOW
BUWEPS

• Aye, Aye, Sir.

Seventh Difference

St. Paul, Minn.—As a secretary in one of our nation's defense organizations, I came across your June 1965 issue which fascinated my imagination enough that I set it aside and during a few minutes of spare time, glanced through it only to find that it was extremely interesting for an ordinary layman to read.

Your article entitled "Three Engine Emergency Rate of Climb . . . Positive or Negative?" was so interesting and enlightening—the others were also.

My main reason for writing though was to point out your drawing on page 43, entitled "Six Differences" and to inform you that we found the 7th dif-difference which you did not list. We noticed a crack or break in the arm extending from the main gasoline can to the funnel or spout—evidently this is used for carrying the can, since no handle shows on the gasoline can.

Again let me say your magazine was a real delight, and I sincerely hope that I can run across more of these in the routine of office work.

MRS. MARY CORNELIUS
UNIVAC DIV. OF SPERRY RAND CORP.

• Your keen observations and especially nice comments concerning APPROACH **were warmheartedly received.**

Regarding the seventh difference, we are unable to determine whether the artist or the printer cranked in the defect you mention —in any case we are happy to yield to the Lady from St. Paul—there is a difference.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

FOD Control Effort

Bloomfield, Conn.—LTJG S. M. Matyas is to be complimented for the timeliness and practical treatment given the ever-present FOD concern in his August 1965 article, "FOD Inspection Tools." Having recently visited HC-2 and taken special note of the squadron's emphasis on FOD and the results, I can personally vouch for their effectiveness in this area.

Although we can't deny the general validity of Lt. Matyas' description of the UH-2A/B FOD problems, we are understandably sensitive about this subject. After concerted effort on the part

of BuWeps and ourselves, operating experience is confirming that design improvements, in addition to diligent squadron FOD control, have markedly reversed the UH-2 airframe FOD trend.

Several minor changes have been released for fleet incorporation providing improved hardware security or elimination of potential FOD in the air inlet areas. More significant changes include the installation of ¼" mesh screens over the main and auxiliary air inlet openings and improved duct adjustment provisions which eliminate gaps between the duct and engine bellmouth. (H-2 IAC 40A; AFC 14 and AFC 62A).

Although we are making a concentrated effort to resolve these problem areas, there is no substitute for heads-up maintenance and conscientious FOD control on the part of the operating personnel. We take our hats off to Lt. Matyas and his HC-2 FOD control team and fully endorse their efforts and suggestions in this area.

ROBERT J. MYER
CUSTOMER SERVICE MANAGER
KAMAN AIRCRAFT CORPORATION

Wanted CV Types

Pensacola, Fla.,—Request additional personnel (orbital type). In the past, as we well know, many problems have arisen that we knew nothing about and had no means to rectify.

To alleviate all our problems, it is urgently requested that the Aircraft Maintenance Department be assigned three men of the special rating "CV" (clairvoyant).

Upon receipt of subject men, all IBM, radios, Quality Control, Maintenance Officers and 3M equipment can be disposed of immediately.

It is estimated that millions of dollars will be saved and thousands of tensions, frustrations, headaches and ulcers relieved by the new additions.

ANYMOUSE

• Unfortunately, your activity, like ours, does not qualify—seems there's a critical shortage of "CV" types to fill primary billets in CVAs.

Shroud Cutter

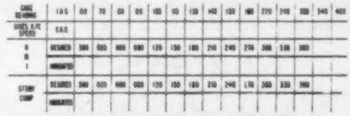
FPO San Francisco—D. P. Williams, PR1, Patron FOUR has devised this method for carrying the MC-1 knife with shroud cutter extended. Four feet of shroud line connects the knife to the pocket. (Life vest toggle has been displaced in photo for better visibility of knife pocket.)

C. O. PATRON FOUR

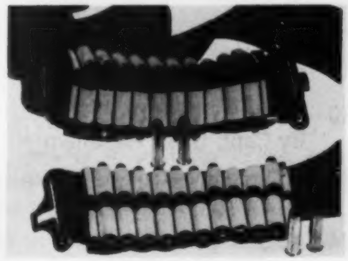
Shroud cutter ready for use

Cards and Cartridges

NAS Lemoore—To save some head and hands stands when reading airspeed and compass corrections, VA-122 has combined the airspeed and compass calibration cards. In A-1's it appears that the best location for them is on the canopy frame, port-side forward.



Airspeed and Compass Card



Cartridge Fix

The cartridge belt is the best fix we've been able to come up with in solving the "lost bullets under the seat" problem.

ASO, VA-122

• Both ideas look good. Passed on.

Possible Pump Mix-Up

FPO New York—This command just got involved in a bad situation. It has happened before but it cooled off until now. It can happen again unless Section B for the S-2 aircraft is revised. 47

It happened this way: Power plants needed an engine-driven fuel pump so went to Section B and ordered a fuel pump listed as Item 24 of Change Bulletin 5-63. When the pump came in the mechanic noted that it had carbon vanes and had a different part number than the defective one. He also recalled a directive prohibiting the use of carbon vane pumps on engines.

An investigation revealed that this pump PN218200 is part of ASC-355 and is for use as a transfer pump only. Further investigation proved that one of these was engine-installed.

The correct pumps are now in order and a UR was submitted to revise Section B and identify this pump as a transfer pump only.

ANYMOUSE

• Good show, Anymouse. Detection of the error by a sharp mechanic and reporting the situation by UR is, in our esteem, worth an attaboy. This is the proper way for getting a change into a technical manual. We pass along your report so that others can be on the lookout for a possible maintenance goof.

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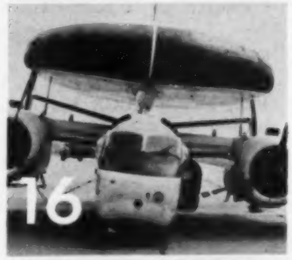
Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.



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CREDITS

Cover painting of Sidewinder launching courtesy Raytheon Co., Lexington, Mass.

Page 10 Photo by Art Schoeni, Courtesy Ling-Temco-Vought

Page 43 Cartoon courtesy OIR Safety Review

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Fleet Staff Safety Officer's Memo On ADMATS

Since it is difficult or perhaps even impossible for us to define "safety" and "safety programs" to the extent that it would be meaningful for all ASOs, your version must be right for the situation.

The composition of your program and how you affect it is your business and while it may work for you, doesn't necessarily mean that it will work for the next man and vice versa.

I don't intend to dig through your files and paper work and for sure won't expect you to have safety posters on the bulkheads at a rate of 3 posters every 10 feet of space. I think an EM Safety Committee is a "must" and the minutes of these meetings should receive full command attention. The parts usage and trend analysis programs in quality control are a vital part of any accident prevention program and warrant attention by ASOs.

Programs designed for the upper decks only don't particularly catch my fancy! I figure if you have 15 pilots on board, you should have 15 safety officers, but this is not true on the working decks! They need to know that accident prevention isn't all lip service and POD Briefs but positive efforts by the commanding officer's personal representative, the ASO. They must be educated as to what part they play in the program and also a more logical answer to their problems than "it says do it, so do it." Those who have been in the safety business for any length of time will know that these people make or break you.

Don't hesitate to tell me about your programs and ideas. The exchange of these items is the prime purpose of AdMats and as such, should receive more attention than is indicated in the form. Problems in any area of safety or survival that you might have are welcome and encouraged.

I won't have all the answers, but we have some 40 to 50 staff officers who are available solely to help the Fleet. Use them!

There should be an instruction which outlines the squadron safety program. This sounds big and could get out of hand. However, there are a few areas, such as safety committees, councils and incident reporting programs which need defining and this is the place to do it. I would like to meet and talk with some of the "working class" people. They sometimes come up with a good idea or suggestion. If not, they're always good for a joke or a humorous picture.

Finally, let's not get too excited and jump off the deep end with these AdMats. Do what you have to do to stop the crunches and educate the people. Who could ask for more?

LCDR F. G. HAMRICK
STAFF AVIATION SAFETY OFFICER

LIFT and DRAG

REVIEW and CHECK:

* Snow/Ice Removal
* Ground Equipment
* Procedures
* Lube
* Clothing
* Safety Ideas
* Shots

PWT

PREVENT
WINTER
TROUBLE

TIME TO START GIVING IT

PLENTY OF THOUGHT